CITY-SIZE AND MUNICIPAL EFFICIENCY:
A STUDY IN THE GEOGRAPHY OF CITY DEVELOPMENT

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DECLARATION

I declare that this thesis has been composed by myself. It is my own work in every respect except where citations of other authors' works required acknowledgement of their contributions within the subject area of the study.

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PREFACE

Many writers have attached considerable importance to the idea that there is an optimum size for cities. A cursory examination of these writings soon reveals that most represent little more than strongly held opinions. Very few individuals writing on the subject have attempted to demonstrate the strength of their convictions. With an emphasis on the more quantitative aspects of the subject, this study undertakes an examination of the optimum size concept with specific attention to the criterion of municipal efficiency and the implications that it has within the institutional context of Great Britain.

The analysis in the study is in part theoretical and in part empirical. The theoretical portion is carried out in general terms so that it could have application within almost any national institutional context. However, the empirical analysis is restricted to selected local authorities in Great Britain.

This research was made possible by generous grants from the Earl of Moray Endowment for Original Research in the University of Edinburgh, as well as grants from the Faculty Research Fund in the University of Denver, Colorado.

In such a study as this where it was necessary to solicit help from many individuals, the author would be very remiss in his obligations if he did not acknowledge this assistance. To cite by name each and every individual who at some point in the research made the author's task easier would be a very long list. The author would like to extend his heartfelt gratitude to these many individuals for their cooperation and aid.

There are a number of individuals and government departments that must be singled out for a special note of thanks. The author is indebted to Dr. John R. James of the Ministry of Housing and Local Government for his aid in obtaining the Epitomes of Accounts covering the local authorities of England and Wales. A similar debt of gratitude is owed to many individuals in the Scottish Development Department for their aid in acquiring the Abstracts of Accounts. The tasks of researchers would be made immensely more pleasant if the degree of cooperation experienced by the author in working with members of the Scottish Development Department were found in other public agencies.

The author appreciates the observations and advice given him by Professor Lloyd Rodwin in the School of Architecture and Planning, Massachusetts Institute of Technology. Also, the author would like to thank Professor F. Stuart Chapin, Jr., Research Director, Center for Urban and Regional Studies in the University of North Carolina at Chapel Hill for his aid on bibliographic materials.

Finally, the author wishes to acknowledge the advice and encouragement received from Dr. Ronald Jones, formerly of the University of Edinburgh, but more recently Reader in the Department of Geography, Queen Mary College, University of London. Our many discussions aided considerably in understanding the complexities of the study. To Professor J. Wreford Watson, Department of Geography, University of

Edinburgh, the author owes a debt of gratitude for it was he who made it possible for the author to come to Scotland for the period of time necessary to research the subject. Both Dr. Jones and Professor Watson provided the author with many stimulating conversations on the subject of the research.

It should be pointed out that parts of this study have appeared in print. Portions of Chapters II, III, and VI are contained in an article appearing in Ekistics, Vol. 28, Number 168, November 1969, pp. 312-315. The title of this article is "City-Size and Its Relationship to Municipal Efficiency: Some Observations and Questions." This journal does not furnish reprints and for this reason one is not included with this study.

The data used in this study covered a period from 1957 through 1964. The author is aware that there have been many organizational changes subsequent to 1964, especially the results of the Royal Commissions on Local Government. It is also recognized that these changes have a bearing on this study. However, for ease of management as well as drawing the time line, the events since 1964, for the most part, are not included in the study.

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FACULTY OF SOCIAL SCIENCES

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By William Arby Howard

Ideal Communities have excited mens' minds throughout history. One of the more intriguing outgrowths of this thinking is the question of whether there is a best size for the city. From Plato to Ebenezer Howard to C. A. Doxiadis this question has had its proponents.

The city-size question is predicated on the idea that the city functions much in the manner of a natural organism. It is therefore presumed to have a teleological, goal-seeking, self-actualizing nature best realized within limits.

Among the various factors identified through the years as desirable within an ideal size city are physical layout, economic base, health, public safety, municipal efficiency, education, communications, family life, and psycho-social characteristics. None of these have been given the attention they merit as to their implications.

Municipal efficiency is singled out in this study for an intensive examination and its implications are studied within the institutional context of Great Britain. Data are analyzed on functional categories as well as total expenditures in

terms of the Rate Fund Accounts of selected local authorities.

The working hypothesis of the study is whether a U-shaped expenditure curve characterizes the operational activities on the Rate Fund Accounts of the authorities. This hypothesis is derived from the economic theory of the firm. Many analogies have been drawn between the firm and the city in terms of function, organization and operational characteristics.

Confirmation of the hypothesis is found lacking; however, this is as much a function of unidentified and therefore unmeasured factors as it is the deficiencies found in the analysis of data. One important fact that emerges from the study is that population size as an independent variable is of little explanatory importance in explaining the broad range of differences in local authority expenditure levels.

Much additional work is required on this problem. There appears to be no easy or facile means of explaining the differences in the levels of expenditures among the local authorities.

"There is, of course, an optimum size for everything, and the great cities of the world are now too big to function efficiently..."[1]

INTRODUCTION

Many writers on urban affairs are strongly convinced that size, either in terms of population or in terms of area, or both, is an important factor to be considered in solving the problems of our urban areas. In these writings there invariably arises the question of whether there is a best, or as it is more frequently put, an optimum size for cities.

Roots of the Optimum City-Size Question. The roots of

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[1]Theo Crosby, Architecture: City Sense (London: Studio Vista, 1965), p. 13. This quotation typifies the opinions of many individuals who have commented on the existence of an optimum size for cities. An equally representative statement is found in Lewis Mumford's The Culture of Cities (New York: Harcourt, Brace and Company, Inc., 1958), p. 488. He states, "There is an optimum numerical size, beyond which each further increment of inhabitants creates difficulties out of all proportion to the benefits. There is also an optimum area of expansion beyond which further urban growth tends to paralyze rather than to further important social relationships."

the optimum city-size question lie deeply embedded in that reservoir of optimism and hope, and abiding faith in progress that has caused men to envision ideal communities throughout history. Many of these utopian writers have often used the analogy of cities functioning in the manner of natural organisms. That is to say, like a natural organism, a city supposedly possesses a teleological, goal-seeking, self-actualizing nature thought to be best realized within limits. Once a city reaches the point in its development where the size is best in terms of its inherent potentialities, should further growth take place it becomes detrimental. Conversely, until a city's growth approaches this most advantageous size it is not fully capable of taking advantage of its potentialities.[2]

World-wide trends toward urbanization have been responsible for a resurgence of concern toward limiting urban sprawl. For many writers any hope of achieving a limitation of urban sprawl lies with demonstrating the existence of the best size for cities, rather than, for example, with the use of zoning or greenbelts. Much of this optimism for successfully demonstrating a best urban size is predicated upon the organic view of the city. It is felt that researchers now understand sufficiently the interrelationships of the whole, as well as its many parts.

That so many writers should feel so strongly regarding

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[2]A discussion of the functioning of the city in terms of an organism may be found in Lewis Mumford, <u>The City in History</u> (New York: Harcourt, Brace & World, Inc., 1961), p. 184.

the efficacy of an optimum size for cities, and yet there be such a paucity of substantive research into the meaning of the idea, seems incongruous. Yet such is very much the case. Conceivably, an explanation for this lack of research lies with the conceptual and methodological difficulties in approaching the subject.

Objectives of Study. The concept of an optimum size for cities covers a broad universe of relationships, some of which, contrary to many individuals' opinions, are not fully understood.[3] Any attempt to examine the multiplicity of possible relationships and to assess what possible meaning they might have within the context of the city-size question would be very ambitious indeed, and very possibly lies outside the energies of a single individual.[4] In this

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[3]Some measure of the complexity of the many relationships found to exist in cities can be seen in the findings of Schriever Associates, an American firm applying systems analysis to the operational problems of American cities. Research findings of this firm show that "...the typical large city has upwards of 130 components, or subsystems, from sewers to schools to hospitals to police departments to job markets, and they must all work together, under a unifying plan, if the city is to survive." Newsweek, August 5, 1968, p. 74.

[4]Professor Percival Goodman, Department of Architecture, Columbia University, recently proposed before the Congress of the United States what he considers the scope that would be required to assess the optimum-size question within the institutional context of America. His remarks are quoted at length in Appendix A and are cited inasmuch as they clearly indicate the energy that would be required for such an undertaking. The complete text of his remarks may be found in Urban America: Goals and Problems, Materials Compiled and Prepared for the Subcommittee on Urban Affairs of the Joint Economic Committee, Congress of the United States (Washington: U. S. Government Printing Office, August, 1967), pp. 59-65.

research, therefore, to keep the study within manageable limits, an examination is made of only one specific aspect of the optimum-size question.

Where previous efforts have been made to examine the optimum-size question, primary concern has been on identifying criteria thought to be most desirable for an ideal urban place. Physical layout, economic base, health, public safety, municipal efficiency, education and communications, family life, and psycho-social characteristics have been enumerated.[5]

Rather than continuing this search for suitable criteria, the purpose of this study is to examine the implications of what is thought by many writers to be one of the most desirable of the various criteria relating to the optimum-size question. The criterion to be examined is municipal efficiency and its relevancy within the institutional framework of Great Britain. By restricting the scope of the study, it is hoped that a fuller understanding of the meaning of this particular criterion within the city-size question will emerge.

Importance of Study. Unless there are some very dram-

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[5]A discussion of desirable relationships to be served in an optimum-sized urban area is found in an article by Robert M. Lillibridge entitled "Urban Size: An Assessment." Land Economics, November, 1952, Vol. 28, No. 4, pp. 341-352. A further discussion is found in Otis D. Duncan's unpublished Ph. D. dissertation in the Department of Sociology, University of Chicago, March, 1949. This work is entitled An Examination of the Problem of Optimum City-Size. This work is available on microfilm from the University of Chicago Library.

atic shifts in over-all world population trends at present, it seems certain that during the next half century some ominous changes are assured as far as trends toward urbanization are concerned.

According to United Nations estimates, the world's population is expected to increase from an estimated 3,005 million persons in mid-year 1960 to something over 6,000 million by mid-year 2000. Of this anticipated world total, it is estimated that 3,413 million will be living in urban places, assuming, of course, that urbanization resulting from industrial growth in the emerging nations continues at present levels. In 1960 the proportion of the world's population living in urban places of 1,000 to 5,000 population or more was estimated at 33.9 percent. By 1975 this percentage is expected to be 42.2 percent, and by the year 2000 it will be 54.5 percent. What these various estimates mean, in effect, is that the total world's population over the forty-year period from 1960 to 2000 is expected to double, but in the same period that portion of the total characterized as urban will treble.[6]

If projected into the middle part of the next century, and assuming no changes in the present trends of urbanization, this presumably could mean that upwards of 80 to 90

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[6]The discussion of world population trends was largely drawn from the following sources: Kingsley Davis, "The Urbanization of the Human Population," Scientific American, Vol. 213, No. 3, September, 1965, pp. 41-54; Homer Hoyt, World Urbanization: Expanding Population in a Shrinking World, Urban Land Institute, Technical Bulletin 43, April, 1962; and the United Nation's Demographic Yearbook for 1960.

percent of the world's population would then be urbanized. Figure 1 shows very dramatically the world population increase anticipated over the next forty years.

Providing the basic necessities of life, i.e., food, clothing, and shelter, to these future earth inhabitants will be a colossal task. Quite possibly, assuring that these future earth inhabitants live in orderly environmental surroundings will be equal to that of providing the basic necessities to sustain life. At least those countries of the world that are just emerging can draw from the reservoir of technological achievements of the more advanced nations for aid in providing for the necessities of life. However, the advanced nations are not overly well endowed with proven principles for ordering urban environments.[7]

One could argue that the task of testing principles for orderly urban functions lies more in the province of the economically advanced nations at present rather than with the so-called underdeveloped countries. In the case

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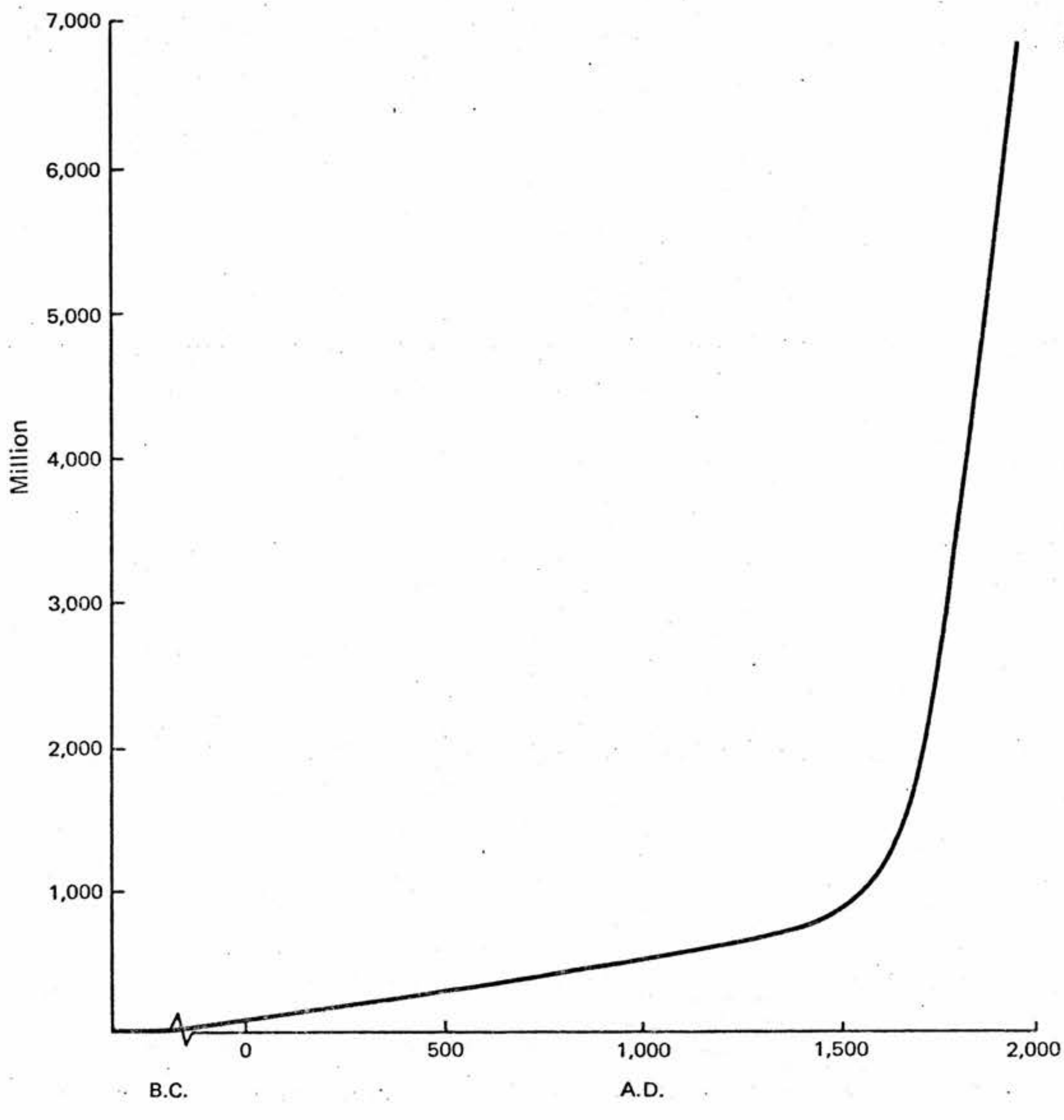
[7]While there are many areas in which the advanced countries have not found solutions to problems brought on by rapid urbanization, ordering principles of a theoretical nature have been suggested, and in some instances proved. Ideas for ordering the urban environments found in the advanced countries outstrip the institutional willingness to experiment or adopt them. As an example of a proven ordering approach to cities in the aggregate, the successes enjoyed by geographers working in the area of central place analysis has prompted many underdeveloped countries to call upon these individuals to help arrange the spacing of towns and administrative centers "before," as Peter Gould puts it, "unplanned processes of urban growth produce areas in the hinterlands not properly covered by agricultural, medical, and educational personnel." See Peter R. Gould, "The New Geography," Harpers Magazine, Vol. 238, No. 1426, March, 1969, p. 92.

FIGURE 1
INCREASE IN WORLD POPULATION



of the latter, their urban problems, in a manner of speaking, lie more with the future; whereas, the advanced nations are presently deluged with problems brought on by very rapid urbanization.

Certainly all of man's collective ordering abilities face some very stern tests in the present as well as the future. In the past, where some measure of harmony was achieved by urbanites living in a few restricted areas of the world, time afforded the "luxury" of testing, often by trial and error, principles for ordering urban environments. It is doubtful if the future will be this beneficent, we can be fairly certain that change will be swift in most areas of the world.

Approach, Methodology, and Organization. Urban geography in the past was mainly concerned with building up a body of knowledge from which generalizations could be made. This approach was primarily empirical and inductive. Today, by turning to more powerful analytical tools, e.g., model construction, and the testing of hypotheses about these models within specific concrete situations, urban geography has largely broken with this former descriptive approach to its subject matter, and it is now more concerned with discovering order and regularity within and among cities.[8]

Peter R. Gould has stated the case very clearly in terms of the approaches being made by geographers of today

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[8]Harold M. Mayer, "A Survey of Urban Geography," The Study of Urbanization (New York: John Wiley & Sons, Inc., 1967), edited by Philip M. Hauser and Leo F. Schnore, pp. 81-113.

when he states, "Geographers are intrigued by the order and regularity they find in the patterns, structures, arrangements, and relationships of man's work on the face of the earth."[9] Of course, these new approaches in terms of urban geography, and of the whole subject matter of geography in general, have not progressed sufficiently far for a large body of proven theory to exist. Only in the instance of central place theory is there a major exception.

Central place theory is interested in the size and spacing of cities, and whether cities are regularly placed or just scattered over the landscape in an irrational or haphazard manner. It is already well established through such studies that cities are not "broadcast" over the earth's surface. Location of cities and their relationships to each other complies with orderly principles. Through a furthering of central place studies it possibly will be revealed that the internal structure of cities follows orderly principles as closely as cities in the aggregate.[10]

The accomplishments, thus far by geographers, and urban geographers in particular, have not come by way of narrowly channelled approaches to their investigations. Rather,

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[9]Gould, op. cit., p. 91.

[10]Two studies which show the promise of the application of central place theory to the internal structure of cities are: Brian J. L. Berry, Geography of Market Centers and Retail Distribution (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1967 and Lisle Serles Mitchess, An Empirical Study of Urban Recreation Units: Playgrounds as Central Places, Unpublished Ph. D. dissertation, The Ohio State University, 1967.

geographers have been working with other researchers in those broad, overlapping areas where problems do not fit neatly into tidy intellectual categories. Such is the case with the present study. It was necessary to draw heavily upon the concepts found more frequently associated with other disciplines, notably, economics, political science, public administration, and urban planning. This was necessary inasmuch as geographers have been primarily interested in urban size from other points of view, e.g., central place considerations and rank size rule. Only B. Shindman[11] and C. B. Fawcett[12] represent exceptions, despite suggestions that geographers could contribute significantly toward answering the question of whether there is a best size for cities.[13]

Although it was necessary to draw upon the ideas usually associated with other disciplines in order to complete this study, the objective was that of attempting to discover whether order is found in the operational functioning of cities, and whether urban size is a variable in this functioning.

The study is organized into three parts. In Part I,

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[11]B. Shindman, "An Optimum Size for Cities," Canadian Geographer, Vol. 5, 1955, pp. 85-88.

[12]C. B. Fawcett, A Residential Unit for Town and Country, (Bickley, Kent: University of London Press, Ltd., 1944).

[13] Harold M. Mayer, "Urban Geography," American Geography: Inventory & Prospect (Syracuse, New York: Syracuse University Press, 1954), edited by Preston E. James and Clarence F. Jones, pp. 157-158.

the objectives, scope, and methodology of the study are outlined in Chapter I. Chapter II is a general review of literature relating to the optimum city-size question. Chapter III is devoted to a specific discussion of previous statements on the criterion of municipal efficiency.

Part II of the study constitutes an analysis of data on selected British local authorities with special attention to expenditure levels. There are two chapters in this part.

In Chapter IV the formulation of the analysis is presented with specific reference to the roots of the municipal efficiency concept within the British local government context. The procedure whereby local authorities were included in the study is also explained in this chapter.

Chapter V constitutes the analysis of data and is concerned with a determination of expenditure levels and patterns among the various authorities as well as establishing their statistical correlates.

Part III of the study is concerned with conclusions. Only one chapter appears in this division. Conclusions arising as a result of the analysis of data are presented along with a discussion of conceptual conclusions regarding the general problem area of the thesis. Further research directions are discussed in the latter part of this chapter.

> "Clearly then the best limit of the population of a state (city) is the largest number which suffices for the purpose of life, and can be taken in at a single view."[15]

> "The limit suggested for the garden city...would allow the size of the city to be sufficient to render the enjoyment of a full measure of social life and culture possible to its citizens, but would not allow that it should grow much larger than is needed to secure this end."[16]

CHAPTER II

BRIEF HISTORY OF CONCEPT OF OPTIMUM CITY-SIZE

Previous research efforts on the optimum city-size question fall into two categories: (1) those representing little more than comment or opinion and (2) those using analytical approaches. The former outnumber the latter. In the following discussion, attention will be drawn mainly to the quantitative efforts. However, it will also be required to cite some of the comments and opinions in order to under-

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[15]Aristotle, Politics (New York: The Modern Library, 1942), translated by Benjamin Jowett, p. 288.

[16]Raymond Unwin, "The Town and the Best Size for the Good Life," Town Theory and Practice (London: Benn Brothers, 1921), edited by C. B. Purdom, p. 81.

stand the origins of some of the assumptions and approaches taken in the more analytical studies.

Three Views of the Best Size for the Greek Polis: The ancient Greek polis exemplifies the first concern with a best size for an urban place. The word polis admits to no equivalent translation in English. It has most often been translated as "city-state"; however, H. D. F. Kitto indicates "...the normal polis was not much like a city, and was very much more than a state."[17] The polis may be fairly accurately described as a socio-political organism which affected almost all aspects of the lives of its inhabitants. Keeping it in bounds, at a scale that was both intimate and discernible, was essential to its proper functioning.

The principle of limitation of size dominated urban planning in ancient Greece. Rather than an individual polis growing without restriction, once it reached a desirable size the extra population founded a new polis. For Aristotle this desirable size was "...the largest number which suffices for the purpose of life and can be taken in at a single view ..."[18] So pervasive was this idea of limitation that, for example, Syracuse at the time of its greatest extension consisted of not one polis but five.[19]

To understand fully this insistence by the Greeks that

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[17] H. D. F. Kitto, The Greeks (Baltimore: Penguin Books, 1951), p. 64.

[18] Aristotle, loc. cit.

[19] E. A. Gutkind, The Twilight of Cities (New York: The Free Press of Glencoe, 1962), p. 17.

the polis be kept within distinct bounds, we must consider briefly the cast of the Greek mind. The most singular thing about the Greek way of thinking was the ability to grasp the wholeness of things. This is in marked contrast to modern man, for as Kitto points out, "...the modern mind divides, specializes, thinks in categories: the Greek instinct was the opposite, to take the widest view, to see things as an organic whole."[20] To be able to take in physically and mentally the entirety of the polis was the reason for the insistence on a limitation of its size.

Scale was not only a matter of some upper population limit for the polis. A polis that was too small was just as unrealistic as one too large. The overly large polis would be absurd because it could not govern itself properly, while one that was too small could not be self-sufficient. What then was the best size? Three views are of particular note, those of Plato, Aristotle, and Hippodamus.

Plato advocated an ideal size for the polis as one with 5,040 citizens. He thought that the ideal size for effective participation in a forum was something in the order of 5,000 citizens. "Citizen" as used by Plato applied only to those participants in the affairs of the polis and did not include women, children, and slaves. In the total number of inhabitants Plato's ideal size probably implies something between 25,000 and 30,000 individuals.[21]

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[20]Kitto, op. cit., pp. 169-170.

[21]Plato, The Laws, Book V contained in The Works of Plato (New York: Tudor Publishing Company), translated by B. Jowett, p. 435.

Aristotle, in none of his writings that this writer has examined, ever suggested a single best population figure for the polis. Rather, the upper and lower population limits of the best size were dictated by the number necessary to insure the viability of the polis. We have some indication of Aristotle's support of the limited-size city when he states in his Nicomachean Ethics that "Evil is a form of the unlimited, and the good of the limited."[22] Further speculation into Aristotle's thinking is provided by Gutkind who says, "Smallness and limitation were, for Aristotle, a moral tenet."[23] C. A. Doxiadis suggests that Aristotle favored a polis on the order of 40,000 inhabitants.[24]

Plato and Aristotle were men of vision. Hippodamus, by contrast, was a man of practical affairs, in fact, a city planner. He suggested the best size for a polis was 10,000 citizens.[25] A cursory examination of population estimates relating to the various sizes reached by the hundreds of poleis of ancient Greece reveals that few actually achieved Hippodamus's ideal size.[26] Barely twenty attained or surpassed 10,000 citizens. Only three, Syracuse,

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[22]Aristotle, The Nicomachean Ethics, contained in Wheelwright's Aristotle (New York: The Odyssey Press, 1935), p. 191.

[23]Gutkind, op. cit., p. 18.

[24]C. A. Doxiadis, Between Dystopia and Utopia (Hartford, Connecticut: The Trinity College Press, 1966), p. 41.

[25]Gustave Glotz, The Greek City and Its Institutions (New York: Barnes & Noble, Inc., 1929), p. 26.

[26]Ibid., pp. 24-28.

Acragas, and Argos, had 20,000 or more citizens during the fifth century. By Greek standards these were enormous, and Syracuse even doubled its population in the next century through the assimilation of conquered peoples. Neither were the _poleis_ with more than 10,000 citizens numerous, nor were those from 5,000 to 10,000 citizens numerous. A size range from 2,500 to 5,000 citizens seems to have been the experience for the majority of _poleis_. As Glotz has aptly stated, "...from a quantitative point-of-view the Greek city was a small affair."[27]

Richness of urban life is not a matter of numbers. The ancient Greeks recognized this and constantly sought to improve on the _polis_ and to put it in a more meaningful perspective. To the extent that they achieved this is one of their most important legacies in the field of urban planning. Certainly the Greek insistence upon urban limitation, in principle as well as practice, is the source of much comfort among contemporary students of the city in finding a proper or optimum size for our cities.

Viewpoint of Leonardo Da Vinci. From the period of the Greeks to the Garden City Movement the only noteworthy suggestion regarding the best size for a city was the view of Leonardo Da Vinci's, this despite the many interests in new towns during the latter stages of the medieval period and on into the Renaissance.

Da Vinci suggested, with little explanation as to why, that the best size for a city was 30,000. This figure

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[27]_Ibid_., p. 28.

seemingly represents little more than an expression of the interests in ideal towns during the time that he lived. About the only importance that can be attributed to his viewpoint is that it represents part of the body of opinion which supports the small size city from Plato and Aristotle to the Garden City Movement in modern times.[28]

Optimum Size of the Garden City. In 1898 Ebenezer Howard, an unpretentious court recorder, published a small volume with the title, To-morrow: A Peaceful Path to Real Reform, later changed to Garden Cities of To-morrow when re-issued in 1902.[29]

In this very simply-written work a far-reaching prescription was outlined for changing the role of the city. Howard took exception to the many ills he saw in contemporary cities and sought ways of alleviating these ills. His reaction against industrially congested cities did not favor the countryside over the city. He was aware of the magnetic qualities of cities and of the economic, social, and cultural possibilities that cities held for their inhabitants. He sought a role for the city in which the city and country would be in balance. Urban dwellers should be able to enjoy and benefit from the economic opportunities of the city as well as the recreational aspects of the countryside. Howard envisioned a city which was mainly a self-supporting entity

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[28]Leonardo Da Vinci, The Notebooks of Leonardo Da Vinci (New York: George Brazeller, 1958), edited by Edward MacCurdy, Vol. II, p. 1247.

[29]Ebenezer Howard, Garden Cities of To-morrow (London: Faber and Faber Ltd., 1965).

with its own economic base, regionally situated and complete in its design. It was not to be a dormitory graft onto already existing urban areas. The most important conceptual aspect of Howard's city was the limited scale.

Howard put the optimum size for the Garden City at 32,000 with 30,000 in the city proper and 2,000 in the agricultural greenbelt encircling the city. He offered no defense of his suggestion regarding size, nor in any of the literature examined by this writer has any other author adequately defended Howard's figures. On the face of it, his optimum population size, his assumed area for the city and the specific residential densities that he advocated are arbitrary. Nonetheless, his support of the small sized city enlisted many other important subscribers, notably Osborn,[30] Purdom,[31] and Unwin.[32] Most importantly, it is doubtful if anyone would dispute that the general support for the small sized city, coming from the so-called Garden City Movement, was instrumental in establishing the optimum size range incorporated into the New Towns Act of Great Britain in 1946.

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[30]Frederic J. Osborn, Green-Belt Cities: The British Contribution (London: Faber & Faber Ltd., 1946); Frederic J. Osborn and Arnold Whittick, The New Towns: The Answer to Megalopolis (London: Leonard Hill, 1963).

[31]C. B. Purdom, The Building of Satellite Towns (London: J. M. Dent & Sons, 1925 & 1949); C. B. Purdom, The Garden City, A Study in the Development of a Modern Town (London: J. M. Dent & Sons, 1917).

[32]Raymond Unwin, Town Planning in Practice: An Introduction to the Art of Designing Cities and Suburbs (London: Unwin & Unwin, 1909).

The _Final Report of the New Towns Committee_ concluded that the optimum normal range of population for the new towns should be from 30,000 to 50,000 in the built-up area whether the town was entirely new or an extension of an already existing urban place.[33] The reasons for establishing this size range are interesting.

> "Factors which govern the upper limit of the population range include:
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> (1) Dwellings should be within walking or cycling distance of the industrial zones and shopping and cultural centres, thus minimizing the need for local transport.
>
> (2) Contact with the countryside is essential; the country should be within reasonably easy reach of the centre.
>
> (3) It is difficult to attain a sense of civic consciousness and unity in very large towns.
>
> (4) As most new town projects are likely to be started while the demand for housing will still be very great, speed in creation will be a primary objective. Several medium-sized towns at a reasonable distance from the conurbation whose congestion they have to relieve can be built more quickly than a smaller number of larger towns. An important factor will be the availability of workers, and it would be more difficult to draw them from a conurbation to one or two large new towns than to several smaller towns. Difficulties of transport and accommodation would add considerably to the cost. If the projects be within reach of the outer rim of the big pools of labour, it will make for speed and economy in building. This, incidentally, is one reason why peripheral suburban spread is so hard to resist.

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[33] Great Britain, Ministry of Town and Country Planning, _Final Report of the New Towns Committee_ (London: H. M. S. O., 1946).

Factors which govern the lower limit are:

(1) Up to a certain point the larger the town the higher the standard of social and cultural services, shopping facilities, and other amenities; below a certain point these are difficult and expensive, if not impossible, to provide.

(2) A well-balanced provision of industries is desirable to ensure continuity of occupation for men and women. The smaller the town the harder it will be to secure an adequate variety and number of industries.

(3) In a very small town it is unlikely that a balanced community, representative of all income and social groups, can be secured.

There are other circumstances which will affect the size:

(1) The new town is to be surrounded by open country and must not coalesce with other settlements; if a town forms part of a group of towns rather near together or is near a big centre with ample social and education amenities, its population can be smaller than that of a more isolated town and yet have all essential amenities within its reach.

(2) Where there is an industry which, of necessity, has to operate on a very large scale, the upper limit might have to be raised to secure a balanced population.

(3) The physical characteristics of the site and the existing use of land may affect the extent of the building area and therefore the population."[34]

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[34]Ibid., pp. 8-9.

The New Towns Committee recognized that economic, cultural, and social conditions varied in England, Wales, and Scotland as well as regions within each and, therefore, the lower and upper ranges of the population sizes might be more applicable within one region than another. Also, allowances were made for specific local conditions affecting the size level.

Size Considerations beyond the New Towns Act. Contrasting with the population size range incorporated into the New Towns Act are conclusions derived from a study by Colin Clark on the question of the population required for a stable economic base in a city.[35] He analyzed data on British, Canadian, American, and Australian cities and concluded that the most important element of the economic base was the service component rather than manufacturing industries. His specific conclusions are worthy of noting.

> "...The principal function of the city is now the provision of service industries rather than manufactures and will be so to an increasing degree.
>
> ...a region can give its inhabitants an adequate range of commercial services when the population of its principal city is somewhere in the neighbourhood of 100,000 to 200,000.
>
> ...in the case of the other service industries, a smaller population will generally suffice.
>
> ...manufactures tend to be concentrated in the older settled communities; in the more newly settled communities, where the manufacturing population is lower, a city somewhere between 200,000 and 500,000

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[35]Colin Clark, "The Economic Functions of a City in Relation to Its Size," Econometrica, Vol. 13, No. 2 (April, 1945), pp. 97-113.

population is necessary for full development of manufacture."[36]

Brennan, in 1949, in a study stressing desirable social relations added additional support to the desirability of the small town.[37] His optimum size lay between 10,000 and 20,000 persons. He rejected any city exceeding 100,000 or more. Such a city would be, according to Brennan, too large to exist economically as a complete unit, and certainly it would be too large to foster the closely knit social life which he believed desirable. It is interesting to note that in the 1920's Lord Bryce and John Dewey both arrived at the conclusion that no city could function democratically or responsibly if its population exceeded 100,000.[38] Both were of the opinion that neighbourhood-type democracy could not be accommodated within a highly industrialized society. Governmental functions would be too complex.

Another study dating from 1949, and possibly the most important thus far on the optimum city-size question, is that by Duncan.[39] At the time of his writing Duncan came to

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[36] Ibid., p. 112.

[37] T. Brennan, Midland City (London: Dennis Dobson, Ltd., 1949), p. 47.

[38] Robert C. Wood, Suburbia: Its People and Their Politics (Boston: Houghton Mifflin Company, 1958), p. 42.

[39] Duncan, op. cit., 281 pp. Abstracts are found in Paul Hatt and Albert Reiss, Reader in Urban Sociology (Glencoe, Illinois: Free Press, 1951), pp. 632-645; and James Dahir, "What is the Best Size for a City?" American City, Volume 66, August, 1951, pp. 104-105.

no general conclusions as to the best size. He thought that the availability of data of sufficient quality and quantity for such a demonstration mitigated against suggesting a best size. He did offer some circumscribed conclusions about certain criteria that he considered of first importance in the functioning of a city. Aspects of these are discussed below. Duncan's categories, although they are vague, are followed in this discussion.

<u>Physical Layout</u>. This criterion relates to the journey to work. On the basis of his analysis Duncan indicated threshold populations within the American situation where certain types of transportation became economically feasible. With a population of 10,000 to 15,000 persons some form of mass transportation was necessary. A population of 50,000 or more made street cars economically justifiable, although Duncan admitted that with changes in transportation technology this figure would probably increase. The automobile seemed to diminish in importance with increasing size. Probably this is both a function of population density and traffic congestion. Analyzing 22 American cities, Duncan found that in seven cities ranging in population from 25,000 to 100,000 there was a median of 81 percent who travelled to work in private automobiles; in six cities between 100,000 and 500,000 the median percentage dropped to 72; and for nine cities with populations exceeding 500,000 the median fell to 41 percent. Curiously enough, Duncan did not attempt to relate modes of transport to distances travelled. No effort was made to relate physical layout

to ease of access and distance travelled by various means.

Family Life. Duncan found the small town more conducive to family life. Single family dwellings were more plentiful and rents usually were lower. Families in small towns were more closely knit than in the case of larger cities.

Churches and Voluntary Organizations. Here Duncan's main concern was at what point in terms of size does a city begin to offer something of a cross-section of the main religious groups for its inhabitants. Also, when does the population reach the point where voluntary organizations are of sufficient number to meet the needs of the inhabitants. In his analysis he found that a city of 30,000 population approached something of an optimum in terms of religious denominations. Such a city size was found to offer worship opportunities representing 75 percent of American church groups and 90 percent of American church membership.

In terms of voluntary organizations data were lacking. Duncan's conclusions suggested that larger cities offered greater variety and better financial support for such organizations, but in terms of particular types of voluntary organizations both the scope and influence were greater in smaller communities.

Economic Diversification. Duncan found that the often accepted assumption that the larger city is more capable of weathering adverse economic conditions is questionable. He found that medium-sized cities suffered no more in times of economic crises. Furthermore, in terms of diversification of employment the medium-sized cities were comparable in many instances to the larger ones.

Health. Two types of criteria were considered by Duncan in analyzing the health of urban residents. First, facilities were considered for the treatment of disease and, secondly, risk of ill-health which the inhabitant might incur.

Data on physicians within a given area revealed that cities of 500,000 to 1,000,000 had 75 to 100 percent more physicians in relation to population than cities of 2,500 to 5,000. Specialists were found to increase until the population approached 1,000,000 where the ratio fell significantly. These trends implied a shift in pattern of service beyond the 1,000,000 population category with more dependence on team-practice and clinics.

In surveying hospital availability Duncan found that 95 percent of all cities with populations above 10,000 had a general hospital; only 75 percent of all cities between 5,000 and 10,000 were found to have hospitals; and only 50 percent of the cities ranging in population size from 2,500 to 5,000 had hospitals. No attempt was made to relate numbers of people to the numbers of hospital beds, a measure which would appear much more meaningful in terms of a person getting hospital treatment when necessary.

It was found that infant mortality and maternal mortality were inversely correlated with cities of 100,000 population and over, with those cities consistently having lower rates. Through Life Table Analysis Duncan found that in the first year of life the mortality rate was inversely related to city-size and that this advantage of the larger cities was maintained through early adulthood, but ultimately passed to the advantage of the smaller cities later in life.

Municipal Efficiency. No definitive conclusions could be derived on this criterion as Duncan analyzed only one year's data, and he felt that a longer period was needed to reach any conclusions regarding the advantage of cities of any particular size range, but he tentatively suggested that cities between 50,000 and 100,000 were possibly most "efficient."

Education and Communication. On this particular criterion the advantage seemed to rest with the larger cities, especially in terms of physical facilities and budgets. At the time of Duncan's analysis support for a well-stocked library, a radio broadcasting facility, a daily newspaper, a symphony orchestra, or a movie theater demanded a fairly large population. There was considerable variation among the specific items falling under this category.

Retail Facilities. A city of 50,000 and above was found to have the entire range of 65 kinds of businesses outlined in Duncan's study. Specialty shops, such as jewelry, silverware, clocks, and certain types of women's apparel, were found to appear when the population approached 100,000.

Public Safety. Cities over 50,000 were found to have a higher incidence of crime. Per capita expenditures for public safety regularly increased with city-size, with the largest cities spending three to four times as much per capita as the smallest. It was found that there was more chance of fire hazard in the smaller cities, but a greater average loss measured in either property loss or property damage in the larger cities. Expenditures for fire protection were found to increase in a per capita sense with city-size, but the largest fire departments, relative to population, were not found in the largest cities, but rather within those with a population range of 50,000 to 250,000.

Psycho-social Characteristics. Duncan found this particular criterion a difficult one to assess. He attempted to measure the creative activities of men and relate these to various institutional innovations, i.e., changes in government, social changes, and cultural advancements. He found that innovations occurred more often in large cities. Inventions, however, were found more commonly associated with cities between 25,000 and 50,000 that were satellites of larger urban areas. Individuals of prominence, i.e., those having acquired some measure of distinction or eminence either in their professions or as community leaders, were found about twice as prevalent in the larger cities as the smaller ones.

Duncan's analysis of desirable criteria was taken a step further in 1952 by Lillibridge.[40] Whereas Duncan dealt almost exclusively with American data, Lillibridge included British data in his assessment of the research to-date on the optimum city-size question. His conclusions are more explicit than were Duncan's.

> "For many criteria involving residential functions, such as access to open areas, health, public safety, recreation, and family life, it appears that cities of around 50,000 may be most desirable.
>
> Many criteria indicate the necessity for a population base, ranging from 100,000 to 300,000 for certain types of industrial activity, certain professional schools, and certain types of recreation and retail facilities as well as for a relative degree of municipal efficiency."[41]

Support for the intermediate size city, i.e., between 100,000 and 250,000 has come from two recent efforts in planning. The Soviet Union is presently undertaking the planning of new towns where it is thought that the optimum size is between 180,000 and 250,000.[42] According to the Soviet planners this range allows the most favorable conditions for the population fully to enjoy public amenities,

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[40] Lillibridge, op. cit., pp. 341-352.

[41] Ibid., p. 351.

[42] Yu. Bocharov, M. Marjus, and V. Simbirtsev, "Opyt proektirovania optimal 'nogo goroda,'" Arckhitektura S. S. S. R., No. 12, 1960, pp. 10-15. Translated from the Russian by G. L. Cairns with the title, "Experience in Planning the 'Optimum' Town," Department of Scientific and Industrial Research, Building Research Station, Garston, Watford, Herts., February, 1963, Library Communication No. 1151.

and optimum conditions are met for the development of town-forming industry. As will be pointed out in Chapter III this population range agrees closely with some findings in the American experience in terms of operational costs of local governments.

Further support for the intermediate size city is the plan for the American new town of Columbia.[43] This plan strongly stresses a mesh of neighbourhoods and "villages" within the whole town: a neighbourhood consists of 300 to 500 families (1,200 to 2,000 people), and five neighbourhoods form a "village." A village consists of 3,000 to 5,000 families (12,000 to 20,000 people). The entire town will contain a total population of approximately 125,000.

Sentiments strongly supporting the small town have been expressed recently by Doxiadis.[44] He favors a town of about 50,000 population principally on social grounds. Unfortunately, he did not bother to elaborate on his reasons.

Support for both the small-size city and the intermediate one have come by way of a study conducted at the University of Lille in France.[45] This study stressed an

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[43]Paul D. Spreiregen, Urban Design: The Architecture of Towns and Cities (New York: McGraw-Hill Book Company, 1965), p. 73. It should be pointed out that there appears to be a discrepancy in Mr. Spreiregen's work on the number of neighbourhoods necessary to form a "village." On the basis of the figures given for the population of neighbourhoods as well as a "village," ten rather than five neighbourhoods would form a "village."

[44]Doxiadis, op. cit., pp. 41-42.

[45]Comite D. Etudes Regionales Economiques Et Sociales, Niveaux Optima des Villes: Essai de Definition d'apres l'analyse des structures urbaines du Nord et du Pas-de-Calais (Lille, 1959).

"optimum urban structure" based on a region. A single city with from 200,000 to 400,000 inhabitants is viewed as the regional capital around which are a network of cities in the range of 20,000 to 30,000 inhabitants.

On the basis of this overview of the more general observations and research findings on the city-size question, one is forced to conclude that there is a bias in favor of the small city with only a few findings supporting the intermediate or medium-size city.[46] Most of the sources cited are overwhelmingly opposed to the large city although recognition is made by many of the authors that certain functions within cities can only come about as a result of large scale. However, there are some serious supporters of the large scale city and included among these are Le Corbusier,[47] Justement,[48] Frank Lloyd Wright,[49] and Paul and

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[46]Some clarification is needed as to the various sizes of cities referred to here. From the literature cited it would appear that a small city is one with fewer than 100,000 persons. An intermediate or medium-size one has over 100,000 persons with the upper limit around 300,000. A large city has more than 300,000 persons. These categories should not be thought of as very rigorous. They more or less reflect the individual author's views.

[47]Charles E. Jeanneret-Gris (Le Corbusier, Pseud.), City of Tomorrow and Its Planning, translated from the 8th French edition of Urbanisme by Frederick Etchells (London: Architectural Press, 1947).

[48]Louis Justement, New Cities for Old: City Building in Terms of Space, Time, and Money (New York: McGraw-Hill Book Company, Inc., 1946.

[49]Frank Lloyd Wright, "Broadacre City, A New Community Plan," Architectural Record, Vol. 77 (April, 1935), pp. 243-254.

Percival Goodman.[50]

Corbusier thought a city of 3,000,000 best in terms of size. This figure corresponded to the population of Paris at the time of his writing; his ideal size apparently was wholly on personal grounds as he made no effort to validate his thinking.[51] For Justement the ideal city population size was 1,000,000.[52] His plan applied to Washington, D. C.; and the rationale for his ideal size lay principally with the necessary area to ensure a viable economic base for America's capital city. Wright's Broadacre City had no limit to its size.[53] His city proposal was another of many proposals to bring the attractions of the countryside into the city. Paul and Percival Goodman thought a city of from six to eight million most suitable in terms of fulfilling the needs of people living in metropolitan areas.[54] Their ideal size reflects the city of New York's population at the time of their writing.

Clearly no consensus emerges from the foregoing discussion as to the best size for a city. Numerically speaking,

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[50]Paul and Percival Goodman, Communitas: Means of Livelihood and Ways of Life (New York: Vintage Books, 1960).

[51]Corbusier, op. cit., p. 172.

[52]Joseph De Chiara and Lee Koppelman, Planning Design Criteria (New York: Van Nostrand Reinhold Company, 1969), p. 273.

[53]Wright, op. cit., p. 254.

[54]Goodman, op. cit., pp. 125-134. Also Chiara and Koppelman, op. cit., p. 273.

there are more individuals who favor the small town than either the intermediate or large size city. This lack of consensus lies in part with the analytical difficulties of viewing the city and its various sub-systems in a total framework. For this reason, as indicated in Chapter I, any attempt to examine the multiplicity of relationships in any given city is extremely ambitious and difficult. In the opinion of this author, if further progress is to be made on the general problem of an optimum size for a city, a sharpened perspective must subject the criteria that have thus far been identified as desirable to individual analysis in order to better understand their various implications. As it is the stated objective of this study to examine in depth the implications of the criterion of municipal efficiency, the various research findings relating to this subject must be examined. This discussion follows in Chapter III.

CHAPTER III

THE CRITERION OF MUNICIPAL EFFICIENCY

Within the context of an optimum city-size out of the various criteria thought desirable, with the single exception of economic base, more importance has been attached to the criterion of municipal efficiency than any other. Fundamentally the criterion of municipal efficiency implies that the city be of such a size that it can provide the essential services of desired scope and quality at a minimum cost per capita of its population. This is the way most researchers have formulated the problem.

As early as 1910 Baker analyzed expenditure data on a group of 72 English cities and concluded that in cities ranging from 25,000 to 750,000 population there was a tendency for the lowest per capita expenditures to occur around the 90,000 population figure.[55] A service-by-service inspection revealed that with increasing the population beyond 90,000, gas and electricity costs fell whereas costs for all other services increased.

While with the London County Council, R. Lillibridge analyzed municipal statistics on British cities for the years 1912-1913 and confirmed Baker's conclusions to some

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[55] C. Ashmore Baker, "Population and Costs in Relation to City Management," Journal of the Royal Statistical Society, December, 1910, pp. 73-79.

degree.[56] He found that the per capita costs for those cities above 250,000 population considerably exceeded per capita costs in cities smaller than that figure.

The Barnet House Survey Committee of Oxford University made the assertion in 1938 that cities between 100,000 and 200,000 population were cheapest to operate.[57] Furthermore those cities outside both these limits were disproportionately costly.

H. Phillips supported the Oxford findings in his study of 1942.[58] He analyzed nine types of municipal expenditures relating to British cities and concluded that cities averaging 108,000 to 124,000 had the lowest per capita costs. It was his opinion that the optimum technical position for municipal efficiency among cities in Britain was somewhere between 100,000 and 250,000.

Some notable differences are found within the American experience. In a report prepared for the Commission of Housing and Regional Planning of the State of New York, D. Davenport analyzed per capita operation expenditures for local governments of almost every size in the state and found

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[56] London County Council, Comparative Municipal Statistics, 1912-1913 (London: 1915).

[57] Oxford University, Barnet House Survey Committee, A Survey of the Social Changes in the Oxford District, Volume I, Economics and Government of a Changing Area (London: Oxford University Press, 1938).

[58] Hugh S. Phillips, "Municipal Efficiency and Town Size," Journal of the Town Planning Institute (May-June, 1942), pp. 139-148.

that villages below 500 population had the highest per capita costs; towns between 1,500 and 2,000 had the lowest costs; towns between 2,000 and 15,000 had practically the same costs; but for cities above 15,000 the tendency was for costs to increase both in relative and absolute amounts with increasing city size.[59]

In 1937 W. F. Ogburn suggested a city-size optimum between 50,000 and 100,000 population based on an analysis of per capita costs of municipal services in urban places in the United States with populations greater than 25,000.[60]

In 1939 the National Resources Committee published a study of urban government in the United States in which municipal finance data for all American cities were analyzed.[61] The specific findings of this study indicated that in those cities above 275,000 population there was a constant rise in per capita costs with increase in city size.

Duncan in his 1948 study based on municipal finance data dating from 1942 agreed basically with the findings of Ogburn.[62] Cities between 50,000 and 100,000 population

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[59] Donald A. Davenport, "An Analysis of the Cost of Municipal and State Government and the Relation of Population to the Cost of Government, Income and Land Values in New York State," Report of Commission of Housing and Regional Planning (Albany, New York, January, 1926).

[60] W. F. Ogburn, Social Characteristics of Cities (Chicago: International Managers' Association, 1937), pp. 17-21.

[61] National Resources Committee, Urban Government (Washington D. C.: Government Printing Office, 1939), p. 33.

[62] Duncan, "The Optimum Size of Cities," pp. 632-645.

seemed to him less costly to operate.

Lillibridge, as Chief Land Planner for the Chicago Land Clearance Commission, analyzed the U. S. Bureau of the Census' municipal finance data for the years 1940, 1942 and 1943.[63] His findings revealed that "...there was a significant lowering and leveling of per capita costs in the city-size groups ranging from 199,999 to 275,000. From that level costs rose abruptly to those of the 600,000 to 799,999 group. Despite the lowering of per capita costs for the 199,999 to 275,000 city-size group, the cities below 25,000 had even lower per capita total operations payment costs."[64] He suggested that an optimum size range may extend somewhere between the 100,000 and the 300,000 population figures.

In a talk before the Edmonton, Alberta, Branch of the Community Planning Association of Canada in March of 1955, Leonard Gertler outlined certain findings resulting from his analysis of both Canadian and American municipal finance data.[65] Specific conclusions based on this analysis were as follows:

> "The American figures, derived from the U. S. Census and covering all cities from 25,000 to 1,000,000 show that the big jump in expenditures occurs after a population of half a million. As cities increase above 250,000 towards 500,000, the average increase per capita cost of government is 50%.

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[63]Lillibridge, <u>loc</u>. <u>cit</u>.

[64]<u>Ibid</u>., p. 347.

[65]Leonard Gertler, "Why Control the Growth of Cities?", <u>Canadian</u> <u>Town</u> <u>Planning</u> <u>Review</u>, Vol. 5, No. 4 (December, 1955), pp. 151-155.

> The Canadian figures, which cover all cities, towns, and villages in Ontario, with populations in excess of 6,000, show the following jumps: as population increases from 7,500 to 10,000 per capita costs increase by 8%; from 10,000 to 17,000 an increase of 2%; 17,000 to 35,000 an increase of 20%; 35,000 to 55,000 plus 5%; 95,000 to 225,000 plus 20%; and finally, the City of Toronto with a population of about 670,000 has a per capita cost of government 20% higher than that of the next largest city of 225,000."[66]

More recently there have been numerous studies by economists as well as one noteworthy sociologist concerned principally with theoretical matters of government finance, some of which have taken size or scale into consideration. A. Hawley,[67] W. Brazer[68] and W. Hirsch[69] have worked on ramifications of local government costs in metropolitan areas. H. Shapiro has examined scale effects among American county government operations costs.[70] Schmandt and Stephens have contributed work on local government expenditure pat-

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[66] Ibid., p. 152.

[67] A. H. Hawley, "Metropolitan Population and Municipal Government Expenditures in Central Cities," Journal of Social Issues, Vol. 7, Nos. 1 and 2 (1951), pp. 100-108.

[68] W. E. Brazer, "The Role of Metropolitan Centers in State and Local Finance," American Economic Review, Vol. 48, No. 2 (May, 1958), pp. 305-316.

[69] W. Z. Hirsch, "Expenditure Implications of Metropolitan Growth and Consolidation," Review of Economics and Statistics, Vol. 41 (August, 1959), pp. 232-241.

[70] H. Shapiro, "Economies of Scale and Local Government Finance," Land Economics, Vol. 39, No. 2 (May, 1963), pp. 175-186.

terns in the United States.[71] None of these studies has made suggestions as to the best size for local government units within the United States.

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[71]H. J. Schmandt and G. H. Stephens, "Local Government Expenditure Patterns in the United States," Land Economics, Vol. 36 (November, 1963), pp. 397-406.

PART II

ANALYSIS OF DATA

$$y = a - bx^2 + cx^3 \text{ which yields:}$$

$$\frac{y}{x} = a - bx + cx^2$$ [72]

CHAPTER IV

FORMULATION OF ANALYSIS

In the previous chapter the reviews of previous work provide some suggestions about possible city-size implications in terms of the municipal efficiency concept.

It is necessary at this point in the study to discuss some of the more fundamental assumptions regarding the municipal efficiency concept as they relate to the local government framework of Great Britain. Also, the working hypothesis in the study must be presented, an explanation of how the local government units were selected must be offered, and the means used to process and analyze the data explained.

Roots of the Municipal Efficiency-City-Size Question in Terms of British Local Government. The conceptualization of the efficiency-city-size question has stemmed largely from the fixing of budgets of local authorities and the carrying out of the tasks of providing municipal services. To understand this more fully, the means available to British local governments for acquiring operational revenues as well as the

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[72] This is usually accepted as a description of the long run total cost function where the economic theory of a firm is concerned. The second part of the function is the U-shaped average cost function. (See: Royal Commission on Local Government in England, Economies of Scale in Local Government Series (London: H. M. S. O., 1968), p. 1.

procedures followed in fixing budgets must be discussed.

Generally speaking, the local governments of Britain derive the major share of their revenues in two ways, by levying rates or taxes and from grants of various kinds available from the central government. A small percentage of revenue does derive from charges on services rendered and facilities provided to local authority inhabitants. By way of illustration, such services as treatment facilities under certain of the local health services and the provision of police at public functions may be cited. Also, revenues accrue from services for work done such as the making up of private streets and the repair or cleaning of drains on private property. Other revenues come from facilities provided by local authorities such as bathing pools, swimming baths, public baths, games in parks, as well as accommodation in property owned by local councils. Taken collectively, all these services and facilities do not represent a major source of revenues. In the past, rates constituted the largest single source;[73] today grants form the largest percentage.[74]

The options available to local authorities for acquiring operating revenues are not as important to the objectives of this study as the assumptions made about how the revenues are put to use. The use of revenues and their allocation is

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[73]J. M. Drummond, The Finance of Local Government (London: George Allen & Unwin, Ltd., 1964). Also, A. H. Marshall, Financial Administration in Local Government (London: George Allen & Unwin, Ltd., 1967).

[74]Lawrence Boyle, Equalization and the Future of Local Finance (Edinburgh: Oliver and Boyd, 1966), p. ix.

related to the fixing of budgets.

Revenue budgets are fixed by local authorities for many reasons; however, the most compelling purpose for establishing such budgets is to ensure that income will be sufficient to meet expenditure commitments over a given period of time. In pulling these budgets together local authorities must work from estimates or forecasts of expenditures which are calculated to provide revenues for providing services at certain levels. Such estimates are seldom in the ideal sense, i.e., local authorities are seldom in a position to spend all they would like. Consideration must be taken of the reaction of the public to municipal goals. There may arise instances where public sentiment is less in favor of spending additional sums on services and more in favor of accruing a surplus to be saved or spent as they wish at a later date. In any event, the revenue budget is a method of relating revenue availability to expenditure commitments. Once the method of raising revenues is set, the revenue-to-expenditure relationship is fixed. Annual rate estimates by local authorities are clear instances of budgets primarily set in order to fix income and expenditure levels.

By law, local authorities are required to levy a rate each year at a level calculated to cover estimated expenditures on revenue accounts during the fiscal year. The normal procedure is one where estimates of expenditures and income from direct charges are prepared for each rate fund department. These estimates are then brought together in a collective manner, revised or pared as deemed necessary, until the total, after deducting central government grants and income from other sources, appears to be a reasonable and expedient sum to ask of the ratepayers. Once the total budget figure is derived, the council then sets the rate at the appropriate level and approves the rate estimates in the amount necessary to meet anticipated expenditures.

Where does the efficiency factor enter into the budgetary equation? According to public administrators,[75] there are a number of points or levels in the process of budget fixing where efficiency comes into play. One such instance is at the time when the overall budget is reviewed by the council. The council and the finance committees of local authorities are charged with the responsibility of reviewing the budgetary demands of each separate service or department and making an assessment as to whether any given service or department is making a reasonable demand for resources in light of the central pool of revenue. Each service or department is ultimately required to operate within the revenue constraints of a fixed income assigned to it by a higher authority. By having each service or department's budget fixed by a higher authority, theoretically speaking, so the argument is put forth, there is less likelihood of unreasonable budgets being presented. Each individual budget constitutes a plan for spending the amount in the best and most efficient manner. In actual fact, adjustments must be made on the budget estimates put forth, as there normally are considerable differences in the so-called "asking figure" and

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[75]A Study Group of the Royal Institute of Public Administration, Budgeting in Public Authorities (London: George Allen & Unwin, Ltd., 1959). See especially Chapter III.

the amount ultimately set by council. Department heads use the age-old "padding method" for establishing the "asking figure," which literally means adding on a certain percentage of the estimate of funds needed so as to establish a figure which, if cut, may, in fact, result in a net gain.

Efficiency also enters the municipal operations process at the service output level. At this point efficiency becomes a matter of the relationship between quantities of manpower and materials and energy consumed, on the one hand, and the amount of goods and services produced, on the other. Within this framework the fixed annual budget can only be an appropriate indication of efficiency if the quantities of input and output are firmly planned or predicted at the time the budget is prepared. Firmly planned or predicting the inputs and outputs of municipal operations is difficult as there are always expenditures which arise within any given budgetary year which cannot be anticipated in advance. Therefore, some flexibility is necessary in budget planning.

Another level where efficiency is thought to be at work is where fixed revenues are translated into actual services and efficiency is established through the use of standards of performance. Such standards are not usually expressed in financial terms but reflect instead the end product of service provision rather than means. In using performance standards in the deliberations surrounding budget fixing, it is necessary to translate what in fact is a ratio between quantities of manpower or materials and output into money estimates at current or expected wage rates and prices in order to make forecasts as to budgetary needs. Making such a translation is extremely difficult and is beset by many unknowns. This difficulty as much as any one thing accounts for the fact that standards of performance are much less widely used among local governments and the central government than is the case for activities found in the private sector of the British economy. It should be pointed out also that in fixing budgets there is less use of formal estimates among local authorities and the central government than is the case for the private sector. Local authorities and the central government depend more on informal discussions and *ad hoc* arrangements for budgetary determinations.[76]

Working Hypothesis of Study. None of the various individuals who have written on the municipal efficiency-city-size subject has seen any necessity to question whether the theoretical instances of efficiency in the municipal sense, as cited above, have any basis in fact. Seemingly there has been a willingness to accept principles behind the municipal operations process and its supposed efficiency character for analytical purposes. With this acceptance has come the concomitant assumption that the outputs of local governments as reflected in the average per capita expenditure figures are sufficient indications of efficiency. From this the argument has been put forth that an examination of the expenditure patterns among various sizes of cities would reveal an efficiency-size relationship, one in theory where a U-shaped expenditure function would emerge. This functional relation-

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[76]*Ibid*., p. 51.

ship is rooted in economic theory.[77] Economists have recognized for quite some time the influence of size upon unit costs. In terms of theory when a firm has a small volume of output, unit costs are high, but with increasing scale production costs per unit of output decline. Implicit in this argument is the notion of equilibrium. By the law of diminishing returns, each additional unit of input yields a smaller increment of output than the previous one until the point is reached that the marginal cost equals marginal revenue. This point represents an equilibrium situation in which a firm maximizes net income. When applied to a municipality the point where marginal costs equal marginal revenue could be said to represent the "optimum" position or scale.

In terms of city growth, as long as there is a decreasing level in terms of the average unit cost of services then economies of scale prevail. Once this advantage is lost then diseconomies of scale result. Based upon the U-shaped characteristics of the theoretical function the left side of the curve represents that area where increasing scale is to

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[77]For excellent discussions relating to this functional relationship see the following: Nels W. Hanson, "Economy of Scale As a Cost Factor in Financing Public Schools," National Tax Journal, Vol. 17, No. 1, March, 1964, pp. 92-95; Henry J. Schmandt and G. Ross Stephens, loc. cit.; John C. Bollens (ed.), Exploring the Metropolitan Community (Berkeley, California: University of California Press, 1961), Part IV, pp. 317-406; Hirsch, loc. cit.; Michael Chisholm, Geography and Economics (London: G. Bell and Sons, Ltd., 1966), pp. 66-108; E. A. G. Robinson, The Structure of Competitive Industry (Chicago: University of Chicago Press, 1959).

the advantage of the municipality and is indicative of the economy of scale situation. Diseconomies of scale are reflected by the right side of the curve.

The principal working hypothesis of this study, therefore, becomes one of attempting to determine whether this theoretical U-shaped expenditure function has any basis in fact when applied to municipalities. It will be tested not only in terms of total expenditures for all municipal operations costs found on the Rate Fund Accounts of selected British local authorities, but also in terms of expenditures relating to certain individual services.

Setting of Study. Data relating to governmental operations among certain local authorities in Britain have been selected for analysis. The data record is an eight-year period from 1956-1957 to 1963-1964 and covers 112 local government authorities in England and Wales (County Boroughs and the Metropolitan Boroughs of London) and 24 local authorities in Scotland (Counties of Cities and Large Burghs). For purposes of comparison, 32 additional local authorities from Scotland (selected Small Burghs) were included, but with the data for only a three-year period from 1962-1964.

Criteria for Selecting Authorities. Two specific factors were considered in selecting authorities to be included in the analysis. First, each authority had to be a rating authority in its own right; and, second, while it was thought unnecessary to include all local authorities in Britain, something of a representative cross-section in terms of autonomy was deemed desirable for purposes of the analysis. The reasons underlying these two factors for selecting authorities relate to the concerns of examining data on municipal expenditures within a particular institutional setting.

It is curious that when one examines the literature relating to the optimum city-size question, and more especially that portion concerned with the municipal efficiency criterion, one gets the distinct impression that previous writers on the subject, when referring to contemporary municipalities, have not recognized that modern local governments are parts of national institutional settings, and that as such they are not wholly autonomous entities, but are hampered by central governments or national economic constraints. It would appear that in conceptualizing the optimum city-size idea the majority of previous writers on the subject have looked upon modern cities as though they are like the ancient Greek poleis or the medieval cities of Europe which were, in fact, not parts of national settings and were for all practical purposes autonomous. One suspects that this lack of perspective is related to the fact that the optimum city-size idea is in part utopian in its inception and that possibly this has clouded the realities of viewing modern cities within various institutional arrangements. Whatever the reason, it would seem that no proper assessment of the relevancy of the municipal efficiency-city-size idea can be made within the context of contemporary Britain unless the institutional setting of the local authorities is taken into account.

As a case in point, consider the relationship that presently exists between the central government and local authorities in terms of levels of revenues available to local authorities by way of rates. Prior to 1948 the local authorities had administered the business of valuation, assessment, and collection of rates. In that year there occurred a fundamental change in the system. The task of valuing property for rating purposes was transferred from local control to the Inland Revenue. A system of grants was introduced, known initially as the Exchequer's Equalization Grant, but later as the Rate Deficiency Grant.[78] In theory these changes were implemented to accomplish a number of things, the most important of which were the establishment of a uniform valuation system in England and Wales and the provision of a system whereby local authorities having rates revenue deficiencies could receive assistance from the central government.[79] These changes were thought eminently more efficient in theory than the prevailing system prior to 1948. And in terms of the adoption of a uniform valuation system this is very likely the case in practice. One must pose the question, however, as to the effects of these changes on such factors as local independence, initiative, and responsibility? The local governments are inextricably meshed with the central government. One could argue validly that with many matters affecting local government and initia-

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[78]This grant is still known in Scotland as the Exchequer Equalization Grant.

[79]Under the provisions of the 1948 Local Government Act, uniformity of valuation applied only to England and Wales. The Act did not transfer responsibility for valuation in Scotland to central authority.

tive there is little action taken until the proper or appropriate decision or "signal" is received from the central government. If for the purposes of illustration the assumption is made that past writers on the city-size question are indeed correct, and a high degree of independence is necessary to ensure a desirable size, and that once having reached this best of all sizes controls be employed through this independence to ensure the maintenance of advantages gained, one must then ask an important question in terms of the relationships that presently are found between the local authorities of Britain and the central government; should researchers be seeking an optimum size for cities or should they be asking what is the most functionally efficient administrative entension of the central government? There are many structural areas where the local authorities are virtually extensions of the central government with much of the initiative residing with the central government. It was on the basis of this institutional perspective, primarily in terms of self-control or autonomy, that authorities were selected for analysis.

Authorities were selected which reflect various levels of self-control. For example, the County Boroughs of England and Wales and the Counties of Cities of Scotland possess the greatest amount of autonomy of the local city governments in Britain. The Metropolitan Boroughs of London have functional powers that are in large measure subservient to a larger local government framework, i.e., the Greater London Council, and as such have intermediate functional powers to those cited above. As for the Large and Small Burghs of Scotland which were included in the analysis, these authorities represent another level of autonomy. Many of their functions are performed by County Councils. The Large Burghs of Scotland are like the non-county boroughs of England and Wales. They provide all services except Education, Valuation, and in certain cases Police. The Small Burghs are similar to the Urban District Councils of England and Wales. This particular form of local authority is the most numerous of the various kinds of local government in Britain. Rather than attempt some random selection process for including units representative of this last form of local authority, it was decided to include only those Small Burghs which the Scottish Development Department uses as "indicators" of changes in trends of local government finance.[80] For a complete listing of all authorities included in the analysis see Appendix B and Table I. Also, Figure 2 in pocket.

Data Utilized. Data relating to revenues and expenditures on the authorities included for analysis were obtained from two sources. For the English and Welsh authorities the data were abstracted from the Epitomes of Accounts filed each year with the Ministry of Housing and Local Government. Data on the Scottish authorities were derived from the Abstracts of Accounts filed annually with the Secretary of State for Scotland.

Only data on services or activities found on rate fund

[80]Certain of the Small Burghs in Scotland are used as "barometers of change" or trends in terms of revenues and expenditures. These represent a sample from the larger population of all Small Burghs.

accounts were included in the analysis. Other municipal accounts are less consistent in their revenue and expenditure characteristics, often reflecting large capital expenditures that unduly affect the long-term trends of the levels of service expenditures. The rate fund services do not show as much in the way of shifts in their yearly expenditure levels as other accounts. Also, the rate fund accounts more correctly reflect an individual authority's abilities to raise revenues locally and therefore stand alone more easily. The latter is one of the broader interests of the study.

Not all revenue and expenditure data found on the rate fund accounts were included in the analysis. Data on selected services as well as total revenues and expenditures for all rate fund services were included. Among the services listed on the rate fund accounts on which data were included are the following: Education; Public Health, sub-provisions of Public Health including Sewage and Sewage Disposal, Refuse Collection, Parks and Pleasure Grounds and Open Spaces; Protection of Children;[81] maintenance of Highways, Bridges and Footpaths; Public Lighting; Fire Protection; and Police. These various activities form the bulk of the rate fund expenditures. For the data record included in the

[81]Under the provisions of various Acts local authorities are empowered to carry out certain duties with respect to the care of children. Among these duties that collectively fall under the heading of "Protection of Children" are the care of deprived children, attention to the needs of foster children, the adoption of children, provisions for remand homes and the various approved schools, and the care of mentally disordered children. See. C. A. Cross, Principles of Local Government Law (London: Sweet and Maxwell, 1966), pp. 318-332.

study see Appendix C.

Other data included in the analysis includes population information on selected governmental units, area, retail sales volumes, rateable value, and information relating to job ratios. These data came from such sources as national censuses or from data compiled by the Institute of Municipal Treasurers and Accountants.

Some explanation should be offered as to why these latter data were necessary to the purposes of the analysis. Data on retail sales, area, rateable value, job ratio, as well as population density were necessary to the requirements of certain statistical tests designed to attempt to account for variations among local authorities in terms of their expenditure levels.

Before considering the means used in processing and analyzing the data, it is necessary to explain an inconsistency in the data as included in the study and as they were derived from sources. In double-entry accounting there must be a balancing of the accounts at the end of a fiscal year. For this reason there are often residuals that must be used to accomplish the balance. In terms of the total expenditure figures as well as revenue figures on the local authorities incorporated in the analysis, these are at variance with those found within the Epitomes of Accounts and Abstracts of Accounts. The primary concern was to get data which most accurately reflected the actual costs and revenues pertaining to a given service or the totals of the services for specific years. Therefore, residuals, such as carry-over sums into another year, were not included.

Data Processing. To process and analyze the data more efficiently, all were coded and punched onto data processing cards in a three-card display. These were then transferred to a magnetic tape and were analyzed by using a Burroughs 5500-B computer system linked to CalComp digital plotter. ALGOL and BASIC were used as programming languages.

CHAPTER V

ANALYSIS OF EXPENDITURE LEVELS AMONG LOCAL AUTHORITIES, AND THEIR CORRELATES

Presented in this chapter is an analysis of data by functional categories as well as total expenditures on the selected local authorities. For purposes of convenience, the chapter is organized in the following manner. First, the characteristics of the various services are described giving their statutory provisions and organization peculiarities. This is followed by an examination of the data relating to the individual services and the total expenditures appearing on the Rate Fund Accounts. The order in which the services are examined is as reported in Chapter IV.

There is a particular aspect of the data inspection on individual services that requires clarification at this point. This relates to the development of two frequency curves for the various services. Two objectives are met by the development of two sets of curves. The first objective is one of describing the general trend of expenditures cutting across the various types of municipal authorities included in the study. The second objective is one of developing a cost-to-size curve relating to only those municipal authorities possessing the highest level of self-determination.[82] Normally, the second set of curves would include

[82]Data on Protection of Children were only available for the County Boroughs of England and Wales, the Counties of Cities of Scotland, and the Large Burghs of Scotland. Thus, it was necessary for only one frequency curve to be plotted based upon the criteria set for deriving the curves.

all the County Boroughs of England and Wales, the Counties of Cities in Scotland, and the Large Burghs of Scotland.[83] However, for both sets of curves the number of authorities actually represented by the curves will vary in number due to data availability as well as whether the service in question is provided by that level authority or by some other authority.

For purposes of organizational convenience, the frequency curves are discussed in pairs. By way of illustration, Figure 3, which relates to Education, represents 137 local authorities and is paired with Figure 4, Education, referring to 107 authorities. As a means of assuring against confusion as to which Figure is being discussed, a notation system along the lines of the following form will be employed. Again, using Education as the example, when referring to Figure 3, the service will be cited followed in parentheses by the number of local authorities represented by the service. Thus, for Education the notation would be, Figure 3, Education (137 Local Authorities) and Figure 4, Education (107 Local Authorities).

All the Local Authorities included in the overall analysis are listed in Table I. The authorities are ranked according to their average population over the years of the data record. Tables II and III present the various size categories

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[83]The Large Burghs of Scotland are not comparable to the County Boroughs of England and Wales nor the Counties of Cities of Scotland in terms of governmental powers. Rather, they possess powers between the Counties of Cities and the Small Burghs of Scotland. Since they possess broader powers than the Small Burghs, they were included with the Counties of Cities and the County Boroughs as a matter of convenience.

TABLE I

LOCAL AUTHORITIES INCLUDED IN ANALYSIS
RANKED BY AVERAGE POPULATION
FOR DATA RECORD

Name	Average Population 1957-1964	Average Population 1962-1964	Rank
Birmingham	1,104,415		1
Glasgow	1,057,977		2
Liverpool	750,399		3
Manchester	664,348		4
Leeds	512,330		5
Sheffield	496,553		6
Edinburgh	471,620		7
Bristol	435,525		8
Wandsworth	343,088		9
Nottingham	313,400		10
Kingston-upon-Hull	301,694		11
Bradford	292,431		12
Coventry	286,415		13
Leicester	274,968		14
Newcastle-upon-Tyne	268,250		15
Stoke-on-Trent	268,231		16
Cardiff	256,539		17
Croydon	251,426		18
Islington	226,185		19
Portsmouth	223,561		20
Lambeth	223,359		21
Lewisham	221,651		22
Plymouth	214,193		23
Southampton	202,989		24
Sunderland	187,978		25
Aberdeen	186,071		26
Dundee	182,303		27
Camberwell	175,473		28
Kensington	169,200		29
Swansea	166,560		30
Hackney	163,446		31
Southend-on-Sea	162,033		32
Brighton	161,189		33

TABLE I
(continued)

LOCAL AUTHORITIES INCLUDED IN ANALYSIS
RANKED BY AVERAGE POPULATION
FOR DATA RECORD

Name	Average Population 1957-1964	Average Population 1962-1964	Rank
West Ham	160,679		34
Bolton	160,629		35
Salford	157,988		36
Middlesbrough	155,236		37
Wolverhampton	148,616		38
Blackpool	147,439		39
Bournemouth	147,370		40
Woolwich	146,820		41
Birkenhead	143,028		42
Stockport	141,929		43
Derby	131,961		44
Huddersfield	129,800		45
St. Pancras	126,813		46
Reading	119,941		47
Norwich	119,014		48
Walsall	117,388		49
Ipswich	116,360		50
Oldham	116,125		51
Paddington	115,193		52
Preston	113,290		53
Fulham	112,293		54
St. Helens	108,918		55
South Shields	108,838		56
Hammersmith	108,801		57
East Ham	107,853		58
Battersea	106,573		59
Newport (Monmouthshire)	106,310		60
Gateshead	106,149		61
Oxford	105,744		62
Blackburn	105,588		63
York	104,970		64
Wallasey	103,221		65

TABLE I
(continued)

LOCAL AUTHORITIES INCLUDED IN ANALYSIS
RANKED BY AVERAGE POPULATION
FOR DATA RECORD

Name	Average Population 1957-1964	Average Population 1962-1964	Rank
Northampton	102,994		66
Hampstead	97,846		67
Paisley	96,586		68
Grimsby	96,440		69
Halifax	95,511		70
West Bromwich	95,261		71
Stepney	93,271		72
Westminster	90,516		73
Southwark	88,110		74
Greenwich	86,634		75
Doncaster	85,520		76
Rochdale	85,450		77
Rotherham	85,230		78
Darlington	83,796		79
Bootle	82,388		80
Bath	81,498		81
Southport	81,046		82
Burnley	80,668		83
Wigan	79,870		84
Exeter	78,459		85
Warrington	77,533		86
West Hartlepool	76,556		87
Greenock	76,322		88
Barnsley	75,194		89
Lincoln	74,973		90
Motherwell and Wishaw	73,279		91
Smethwick	70,340		92
Carlisle	70,254		93
Tynemouth	70,160		94
Gloucester	69,481		95
St. Marylebone	69,293		96

TABLE I
(continued)

LOCAL AUTHORITIES INCLUDED IN ANALYSIS
RANKED BY AVERAGE POPULATION
FOR DATA RECORD

Name	Average Population 1957-1964	Average Population 1962-1964	Rank
Deptford	69,291		97
Poplar	65,956		98
Worcester	65,574		99
Hastings	65,500		100
Barrow-in-Furness	64,836		101
Dudley	64,079		102
Wakefield	61,214		103
Bury	59,879		104
Eastbourne	59,730		105
Chester	59,431		106
Merthyr Tydfil	58,985		107
Coatbridge	53,943		108
Dewsbury	53,399		109
Bermondsey	52,560		110
Kirkcaldy	52,348		111
Great Yarmouth	52,020		112
Stoke Newington	51,586		113
Clydebank	50,617		114
Burton-upon-Trent	49,915		115
Chelsea	48,843		116
Dumfermline	47,876		117
Bethnal Green	47,818		118
Kilmarnock	46,693		119
Ayr	44,667		120
Hamilton	42,242		121
Shoreditch	41,110		122
Perth	41,094		123
Falkirk	37,671		124
Airdrie	33,677		125
Finsbury	33,424		126
Canterbury	30,663		127

TABLE I
(continued)

LOCAL AUTHORITIES INCLUDED IN ANALYSIS
RANKED BY AVERAGE POPULATION
FOR DATA RECORD

Name	Average Population 1957-1964	1962-1964	Rank
Inverness	29,152		128
Dumfries	27,438		129
Stirling	27,367		130
Dunbarton	26,582		131
Rutherglen	25,111		132
Port Glasgow	23,014		133
Holborn	21,095		134
Buckhaven and Methil		20,886	135
Arbroath	19,884		136
Grangemouth		19,791	137
Johnstone		19,553	138
Bearsden		19,234	139
Kirkintilloch		19,108	140
Irvine		18,371	141
Renfrew		18,149	142
Musselburgh		17,714	143
Hawick		16,031	144
Barrhead		15,508	145
Alloa		14,264	146
Saltcoats		14,250	147
Bathgate		13,244	148
Peterhead		12,864	149
Prestwick		12,508	150
Borrowstouness		12,279	151
Elgin		12,258	152
Galashiels		12,254	153
Cowdenbeath		11,627	154
Montrose		10,844	155
Fraserburgh		10,546	156
Forfar		10,244	157
St. Andrews		10,194	158

TABLE I
(continued)

LOCAL AUTHORITIES INCLUDED IN ANALYSIS
RANKED BY AVERAGE POPULATION
FOR DATA RECORD

Name	Average Population 1957-1964	Average Population 1962-1964	Rank
Gourock		10,033	159
Troon		9,852	160
Helensburgh		9,835	161
Kilsyth		9,732	162
Dunoon		9,385	163
Lochgelly		8,945	164
Buckie		7,661	165
Rothesay		7,293	166

TABLE II

SIZE CATEGORIES AND NUMBER OF AUTHORITIES IN EACH

(Includes all Authorities Selected for Analysis)

Group	Size	Number of Authorities
1	7,000- 13,999	19
2	14,000- 27,999	19
3	28,000- 55,999	21
4	56,000- 111,999	53
5	112,000- 223,999	35
6	224,000- 447,999	12
7	448,000- 895,999	5
8	896,000-1,791,999	2
		166

Note: Due to the range of population sizes for the various authorities, it was necessary to use a progression in categories so that all categories contained representative authorities.

TABLE III

SIZE CATEGORIES AND NUMBER OF AUTHORITIES IN EACH

(County Boroughs of England and Wales,
Counties of Cities in Scotland and Large Burghs of Scotland)

Group	Size	Number of Authorities
1	14,000- 27,999	6
2	28,000- 55,999	15
3	56,000- 111,999	43
4	112,000- 223,999	26
5	224,000- 447,999	10
6	448,000- 895,999	5
7	896,000-1,791,999	2
		107

Note: Due to the range of population sizes for the various authorities, it was necessary to use a progression in categories so that all categories contained representative authorities.

developed for the study. Additionally, the number of authorities falling into each category is shown by these tables.

The results of grouping the data into size categories on the tables represent points on the expenditure curves and were derived by computer and their positioning plotted using the CALCOMP plotter. (See Tables IV through XIV and Figures 3 through 23.)

A. Services

At the local authority level there are essentially three organizational structures in the service delivery process.[84] That is to say, in the provision of services, municipalities organize the delivery process into primarily three structural models. First, there is what may be termed the horizontal form. Under this organizational form the service delivery process is structured where a department or division designated to provide the service controls a number of operational units all integrated so as to deliver the service through the pursuit of a unifying policy. Examples of this form of integration are Police, Fire Service, Parks, Refuse Collection and Disposal, Protection of Children, and Health and Highways. Using the Police Service as an illustration, horizontal integration can be demonstrated in that

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[84]For discussions on the organizational models usually associated with the provision of municipal services, see the following sources: John C. Bollens (Ed.), Exploring the Metropolitan Community (Berkeley and Los Angeles: University of California Press, 1961), Part IV, Chapters 14 and 15; Don Patimkim, "Multiple-Plant Firms, Cartels and Imperfect Competition," Quarterly Journal of Economics, Vol. 41, February, 1947, pp. 173-205; Hirsch, op. cit., pp. 233-234.

the service is composed of a number of units, e.g., officers, sub-stations, or patrol units, all furnishing a single service, i.e., police protection, and doing so through a unified policy. Approximately 80 to 85 percent of all services performed at the local authority level follow essentially the horizontally integrated form.

The second form of service organization is what is commonly known as the circularly integrated one. Under this form a number of services are rendered by a single plant, and the various services complement one another. A common or unifying policy is pursued in terms of the provision of these services. The best single example of this form of service integration is the function of the town hall. Many of the activities carried on in the town hall are mutually supporting and complement one another. When the services complement one another and they are carried on in multipurpose service plants, then they follow the circular integrational model. Approximately 5 to 10 percent of the services performed at the local authority level fall into this structural category.

The third form of service integration is the vertical model. This integrational form is one where service operations are carried out on successive levels of the production-service process. The government agency or department controls a number of different operations in the production of ingredients which enter into a service and its provision. Examples of vertically integrated services are water and sewerage and sewage disposal. Each of these services involves an underground distribution system that connects user and treatment plant. The water service treats and distributes water, whereas the sewerage and sewage disposal service collects sewage and treats it, thus the successive levels in the production-service process.

In the following examination of the expenditure levels for various local authorities, only services thought to be either horizontally integrated or vertically integrated are included for analysis. The reason for this exclusion relates to the difficulties in data discrimination in terms of those activities normally thought of as functions carried out in the town hall. Most of these activities, such as those of the Town Clerk, the chief financial officer along with those of the various departments, as well as those of Council itself, are highly interdependent, overlap in many ways; and when expenditures relating to these functions are reported on the Epitomes of Accounts as well as the Abstracts of Accounts, they are lumped together under a heading along the lines of "General Administrative Expenses." Since it is impossible to determine from these data what amounts went for what purposes, the decision was made to drop them from consideration in the analysis at this point. However, the nature of the interdependency, their importance in coordination at the policy level, and the difficulties of accounting for the amount of the total expenditure which relate to certain activities, these are factors which are not lost in the overall study. They are points that have considerable significance to the general conclusions of the study and are discussed in this context in Chapter VI.

Education. As a local authority function, Education falls within the group of functions known collectively as the Social Services. Among these services are found medical services, housing, maternity and child welfare, and the welfare services such as the care of the aged, infirm, deaf, dumb, and blind, and care of children who lack proper parental care. Large sections of the public are served by these services at considerably below cost; others not at all, or but slightly. For the most part these services are provided by locally derived rates or by revenues coming from the Central Government, with the proportion representing the latter a function of the ability of local authorities to pay their own way.

For England and Wales the current system of public education derives from the Education Act of 1944. County Councils, County Borough Councils, and Joint Education Boards were designated Local Education Authorities. Joint Education Boards were designated to provide education over a wider area than territory specifically falling into counties or county boroughs.[85]

In Scotland the control of education in its present form was set by the Local Government (Scotland) Act of 1929.[86] County Councils and Town Councils of the Counties of Cities were designated as the local education authorities.

The various local education authorities are responsible for providing primary, secondary, and further education.

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[85]R. E. C. Jewell, Central and Local Government (London: Charles Knight and Co., Ltd., 1969), p. 119.

[86]Local Government (Scotland) Act, 1929, s. 3.

Operational autonomy is delegated to the various schools subject to the general policies and financial constraints set by the education authorities. Also, general policies and matters pertaining to finances are further subject to constraints from central government agencies: for England and Wales, the Ministry of Education; for Scotland, the Scottish Education Department.

The administrative and operational aspects of education are typical of horizontally integrated organizational structures. There is a governing body controlling a number of service delivery plants, i.e., schools, each of which provides the service through a unifying policy set by the education authority. In terms of the integrational characteristic, one would expect on _a priori_ grounds that the expenditure function for Education would approximate a U-shaped curve. This has been argued rather forcefully on theoretical grounds by various individuals.[87] The argument usually employed is that as a community grows it becomes necessary to add more schools with the result that a point is reached where the addition of more schools is to the disadvantage of the community in terms of per capita costs. One would expect per capita expenditures to be high in the early stages of growth, declining with increasing population, but rising at some undetermined point where diminishing returns occur. Due to the adaptability of schools as

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[87]Nels W. Hanson, "Economy of Scale as a Cost Factor in Financing Public Schools," _National Tax Journal_, Vol. 17, March, 1964, p. 92; and Hirsch, _op. cit._, pp. 233-234.

physical plants, the trough of the curve for Education could possibly carry over a wide range of population sizes. The adaptable nature of the school plants simply means that as the Education function changes through time the fixed plants do not require constant replacement, or, in the language of the assembly line, retooling.

Shown in Figures 3 and 4 are expenditures for Education borne by local authorities as a function of rates. These data should not be taken as the actual total expenditures on Education. Total costs of Education are met in part by rates revenue and in part by grants from central authorities. On the Rate Fund Account Schedule of the Epitomes of Accounts and Abstracts of Accounts, that portion of the Education function borne by grants cannot be determined because only the total central government grants for all purposes is listed. As a result of this data discrimination difficulty, it is assumed for the purposes of this study that the proportion of expenditures for Education met by Rates revenues is sufficiently significant vis-a-vis that amount met by central authority grants that the relationship are such among the various authorities that a meaningful expenditure trend can be established. An inspection of the amounts shown for Education on the Epitomes of Accounts and the Abstracts of Accounts and these amounts compared in magnitude to the revenues derived by way of rates and those derived by central authority grants indicates that this assumption is a guardedly safe one. Its hazards cannot be overlooked, however.

The data shown in Figure 3, Education (137 Local Authorities), have been averaged over the data record and the

TABLE IV

AVERAGE PER CAPITA COSTS
FOR EDUCATION

Per Capita Costs in £.s.d.

Size Category	Frequency Curve No. 1 Data Values	Frequency Curve No. 2 Data Values
7,000- 13,999	$\boxed{17.11.\ 7}$	0. 0. 0
14,000- 27,999	16. 8. 1	$\underline{\underline{10.13.\ 3}}$
28,000- 55,999	$\underline{\underline{13.13.\ 8}}$	13.13. 8
56,000- 111,999	16.11. 1	16.11. 1
112,000- 223,999	16.18. 0	16.18. 0
224,000- 447,999	17.15.10	$\boxed{17.15.10}$
448,000- 895,999	16. 2. 7	16. 2. 7
896,000-1,791,999	17. 7.11	17. 7.11

Lowest costs are underlined.
Highest costs are blocked.

Note: Where all zero values appear in column two, this indicates that data for that size category were not used in deriving the frequency curve.

FIGURE 3
EDUCATION
(As on Rate Fund Account)
137 Authorities

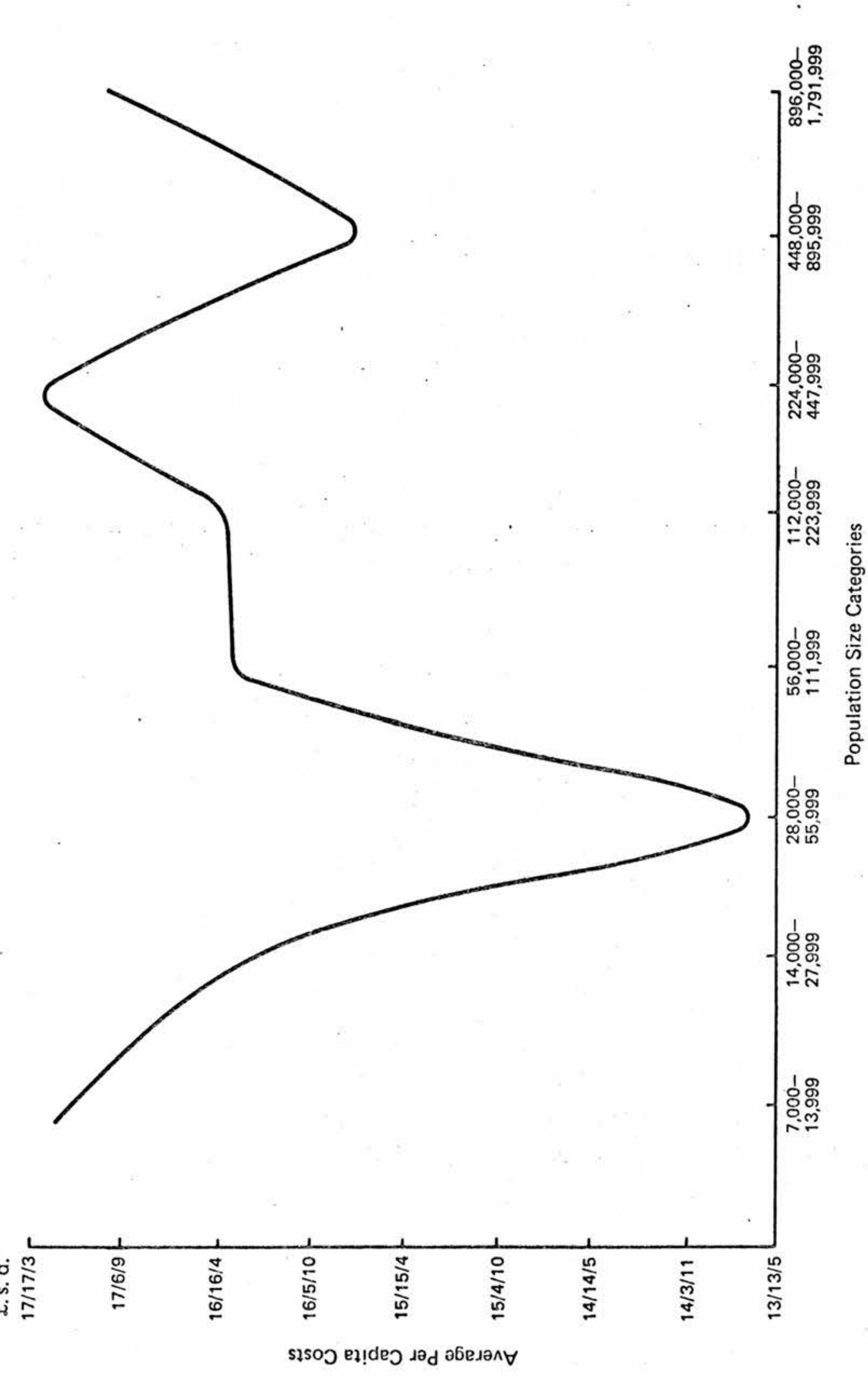
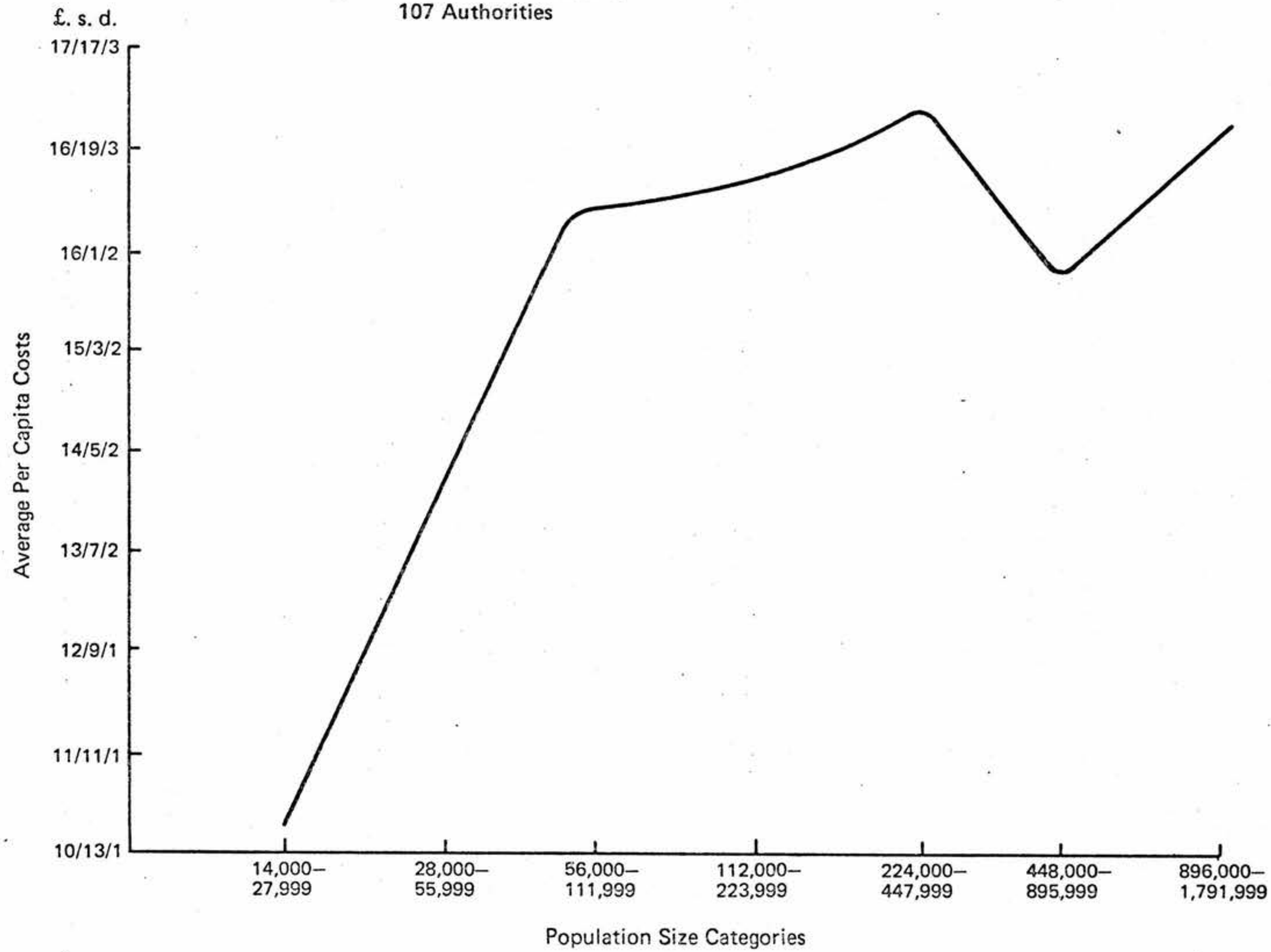


FIGURE 4
EDUCATION
(As on Rate Found Account)
107 Authorities



average per capita costs plotted against local authority population size categories. Included in the total local authorities represented by this figure are the County Boroughs of England and Wales, the Counties of Cities in Scotland, the Large Burghs of Scotland, and thirty Small Burghs of Scotland. Data on these municipal authorities represent precepted amounts by the affected Education Authorities; that is to say, the Education Authorities concerned levied these amounts on the appropriate municipalities as their share in the costs of providing education to children within the authorities. Presumably, these amounts represent a per capita formulation and are fairly realistic in terms of total amounts.

The results of plotting the per capita costs for Education against population size indicates a tendency for a U-shaped curve to develop. Costs decline sharply from the smallest size category down to the 28,000--55,999 range which is the least costly one. Beyond this low point costs rise fairly sharply until the 224,000--447,999 category is reached. At this point they dip down to the 448,000--895,999 level only to rise again with the largest category.

The least costly size category in Figure 3 is that where the population range is between 28,000 and 55,999. This is where most of the Large Burghs of Scotland are found. The most expensive category is that one where most of the Small Burghs are found, i.e., 7,000--13,999.

Shown in Figure 4 is another cost-to-size curve on Education (107 Local Authorities), this one representing those municipal authorities with the greatest level of self-determination. Included within this group of authorities are the County Boroughs of England and Wales, the Counties of Cities of Scotland, and the Large Burghs of Scotland.

In Figure 4, the general trend of the cost curve is one where as population increases there is a corresponding increase in the costs of Education. Upon first consideration one could conclude that this curve suggests an entirely different relationship in terms of educational costs among the local authorities than is shown in Figure 3. However, upon closer inspection it becomes clear that all that is depicted by Figure 4 is the right side of Figure 3, with a few minor differences in the levels of expenditures associated with categories 14,000--27,999; 28,000--55,999; and 56,000--111,999. It would appear that on the basis of the characteristics of these two curves the hypothesized U-shaped function for Education is a plausible one, with the least costly size category the 28,000--55,999 one. However, one would be advised to exercise considerable caution regarding this conclusion. The fact that the least costly population range is the 28,000--55,999 category and this is where most of the Large Burghs of Scotland are found, and these authorities are not Education Authorities, would necessitate due caution regarding conclusions. Furthermore, inasmuch as there has been no accounting for differences in the relative qualities of the Education service reached among the various authorities, one must question the reliance that can be put on the above findings. This note of caution is supported in terms of statistical tests performed on the data pertaining to Education.

Simple linear correlation tests were performed on the data with average population the independent variable and average per capita costs for Education the dependent variable. (See Appendix D.) These tests were performed due to the suggestive nature of Figure 4. In this figure there is an indication of a possible linear relationship. In Figure 3 there is nothing to suggest anything other than a non-linear relationship. As a matter of statistically confirming the descriptive relationships, correlation tests were performed on both sets of data.

The results of the correlation test for the group of authorities shown in Figure 3 yielded a coefficient of +0.07 and a coefficient of determination of 0.61. In effect, there is virtually no relationship between the two variables in terms of this test. Less than one percent of the variability in terms of expenditure levels among the 137 authorities is explainable as a result of population size. This lack of anything like a strong linear relationship was expected in view of the characteristics of Figure 3. However, on the strength of the increase of costs of Education with increasing population as shown in Figure 4, one would have expected some probable degree of linearity. And in terms of the findings for Figure 3 a stronger relationship did emerge. However, the improvement is very negligible. A coefficient of +0.17 resulted and a coefficient of determination of 2.89. Less than three percent of the total variability among the levels of expenditures among the authorities is accounted for in terms of population size.

The results of these tests and the foregoing descriptive analysis suggest two important points. First, in accounting for the expenditure variability among the local authorities, one must conclude that the relationships are more complex than simply relating per capita costs to population size. Second, on a priori grounds one would expect that better educational opportunities are made available in the larger authorities. Better buildings, laboratories, sports grounds, and libraries are all more commonly found in the larger municipalities. Scope and quality of educational opportunities are therefore possible parameters to be considered in accounting for differences in expenditure levels of the various sizes of authorities.

Public Health. Public Health embraces all those activities which relate to the prevention of disease and the general enhancement of the health of members of society. Emphasis is put on the preventive aspects of health care rather than upon the curative.

Under the provisions of the various Acts relating to Public Health, local authorities are empowered with a variety of responsibilities for insuring the health of their inhabitants. Among these are: the inspection and abatement of nuisances (The precise extent of the term "nuisance" has never been accurately delimited in law, but the basic notion is that of hurt or injury or inconvenience. Among those activities considered as nuisances are an obstruction on a highway, a noxious escape of gas, an offensive trade, an ineffective drainage system, the fusion of electric mains, the emission of harmful fumes or vapours from a factory, vibration caused by blasting, and noise or smoke.); sewerage disposal and sewage treatment; street cleansing; the removal of refuse and its disposal; the regulation and inspection of common lodging houses, dairies, milkshops, cowsheds, cellar dwellings, workshops and workplaces, laundries, canal boats, and bakehouses; inspection of food; provision of water supply; monitoring of infectious diseases; the provision of baths and washhouses; river pollution prevention; control of offensive trades and control over slaughter-houses; and caravan site licensing.[88]

The expansion of the scope of local government to include Public Health activities dates from the mid-part of the nineteenth century. The first legislation in England was the Public Health Act of 1848. In Scotland the first Act dates from 1867. There have been many subsequent Acts, primarily amending those of earlier years. However, these are too numerous to be examined here and their actual provisions are not of central importance to this study. What is of particular concern is the structural organization provided by the various Acts for Public Health functions.

In Scotland the central controlling authority for the preventive as well as the curative aspects of health care is the Department of Health. This department also serves as the central supervising authority for housing and planning and for drainage and water schemes.[89] Under the provisions of

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[88]John C. Clarke, The Local Government of the United Kingdom (London: Sir Isaac Pitman and Sons, Ltd., 1948), p. 224; also Jewell, op. cit., p. 134.

[89]J. Bennett Miller, An Outline of Administrative and Local Government Law in Scotland (Edinburgh: W. Green and Sons, Ltd., 1964), p. 184.

the various Public Health (Scotland) Acts,[90] the designation of local authorities has evolved in the following manner:

(1) County Councils are empowered to provide all public health services in the landward areas of their jurisdictions and major services in small burghs. Examples of major services include: Sewerage and Sewage Disposal and Refuse Collection and Disposal. Town Councils of Cities are empowered with the same functions and powers as county councils.

(2) The Town Council of a Large Burgh is empowered to provide all public health services in the Burgh with only a few minor exceptions.

(3) The Town Council of a Small Burgh is authorized and charged with providing certain minor public health services.[91]

(4) Based on the provisions outlined in the Public Health (Scotland) Act of 1897, the Department of Health may by order constitute any local authority whose area forms part of or abuts on a port as a port local authority. The peculiarities of seaports with respect to shipping activities and customs necessitates a special method of treatment in terms of Public Health. For these purposes a joint port local authority may be formed combining two or more local authorities. The joint

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[90] Local Government (Scotland) Act, 1929.

[91] Ibid., 2(1) (e) and (f).

port authority then has jurisdiction over administering public health functions and is considered a separate local authority.

The Local Government Act of 1933 set forth the authorities responsible for carrying out the activities of public health in England and Wales. For the most part, primary responsibility for these activities lies with the Urban District Councils, the Rural District Councils, the (Non-County) Borough Councils, and the County Borough Councils, County Councils enter into the responsibility picture only in regard to coordinating and controlling the actions of the district local authorities.

Other local authorities may be designated under the Public Health Acts for carrying out public health activities. As was indicated for Scotland, port health authorities may be formed where circumstances warrant or require such action.

The integrational characteristics of Public Health activities follow most closely the horizontal model. Yet the diversity of activities falling under Public Health does not make for as clear an integrational picture as one would like. The unifying force for Public Health is primarily the various Acts requiring certain kinds of activities. Given the variety and assortment of activities falling under Public Health, one cannot but wonder what a probable expenditure function would be. In terms of the working hypothesis of this study, however, the argument in terms of a probable expenditure function would be one where as the size of local authorities increases, the scope of services would necessarily lead to an increase in costs. Presumably in the earlier stages of growth, costs on a per capita basis would decline as the initial costs of setting up the service delivery mechanism were overcome. This would then approximate the U-shaped function espoused by the proponents of the optimum city-size viewpoint.

Two cost-to-size curves are shown for Public Health activities in Figures 5 and 6. Figure 5, Public Health (111 Local Authorities), represents a curve based upon expenditure levels of the County Boroughs of England and Wales along with the Metropolitan Boroughs of London. Among the total local authorities selected for inclusion in this study, only the County Boroughs and the Metropolitan Boroughs had data on public health activities.

The trend of the curve in Figure 5 is one where, generally speaking, with increasing size there is a decrease in costs. However, this description requires some qualification. The right side of the curve shows that the decrease in costs is not uniform. Yet the lack of a clear uniformity may be insignificant inasmuch as the last two population size categories have very few authorities represented in them. Were there a greater number of authorities, possibly the trend would be clearer.

On the left side of the curve the pronounced drop in costs per capita from the 14,000--27,999 category down to the 28,000--55,999 one is misleading. Only one authority is found in the 14,000--27,999 size grouping. This exaggerates the slope of the curve unduly. Adjusting the slope of the curve for this exaggeration, the most expensive category is the 28,000--55,999 group and the least expensive is the 224,000--

TABLE V

AVERAGE PER CAPITA COSTS
FOR PUBLIC HEALTH

Per Capita Costs in £ . s. d.

Size Category	Frequency Curve No. 1 Data Values	Frequency Curve No. 2 Data Values
7,000- 13,999	0. 0. 0	0. 0. 0
14,000- 27,999	$\boxed{8. 7. 3}$	0. 0. 0
28,000- 55,999	4.12. 9	3.17. 2
56,000- 111,999	3.14. 0	3.10. 4
112,000- 223,999	3. 8. 4	3.11. 9
224,000- 447,999	3. 5. 1	3. 8. 1
448,000- 895,999	3.17. 9	$\boxed{3.17. 9}$
896,000-1,791,999	3.17. 4	3.17. 4

Lowest costs are underlined.
Highest costs are blocked.

Note: Where all zero values appear in the first column, this indicates that data were not available on Public Health for that size category. Where all zero values appear in the second column, this indicates that data for those size categories were not used in deriving the frequency curve.

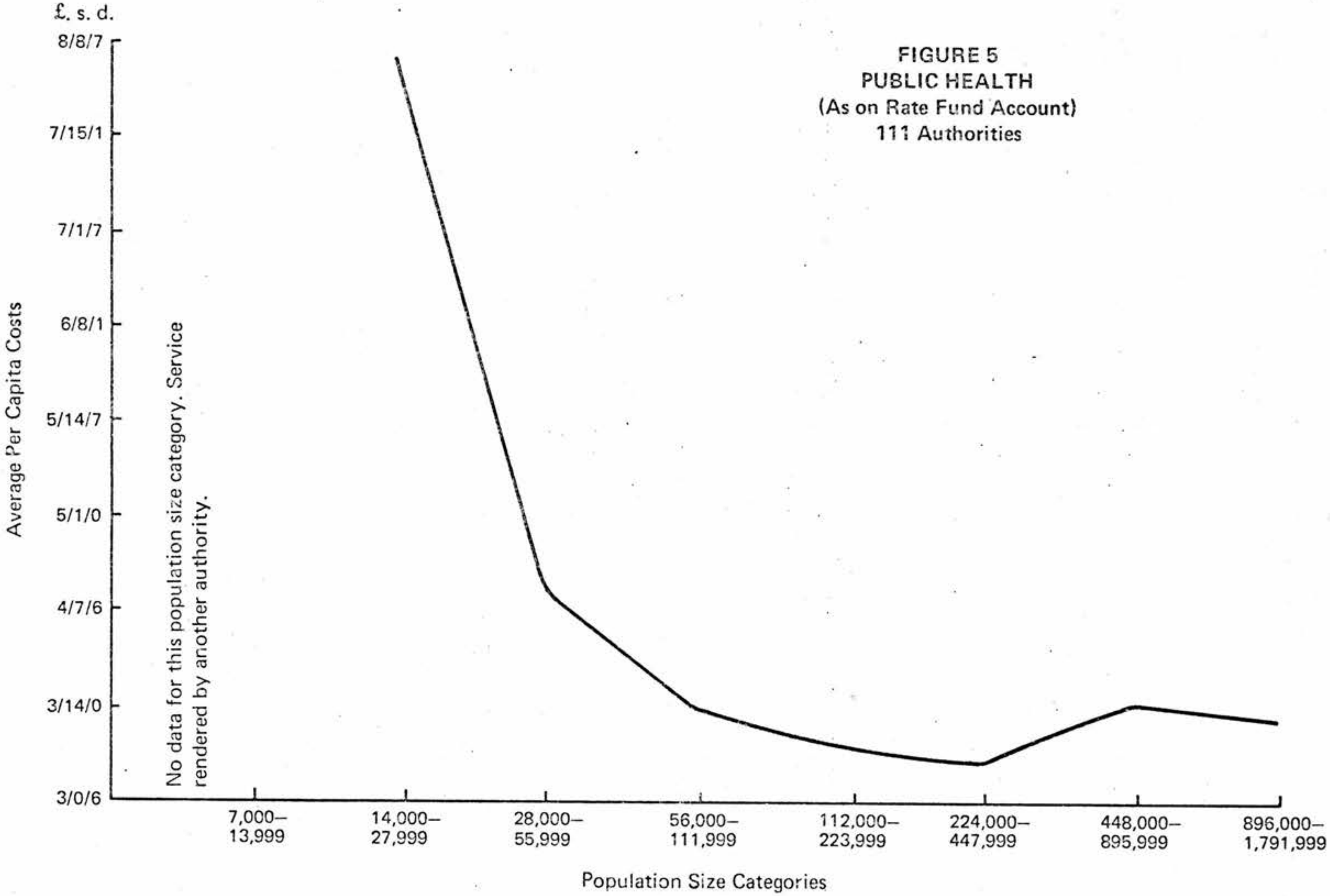
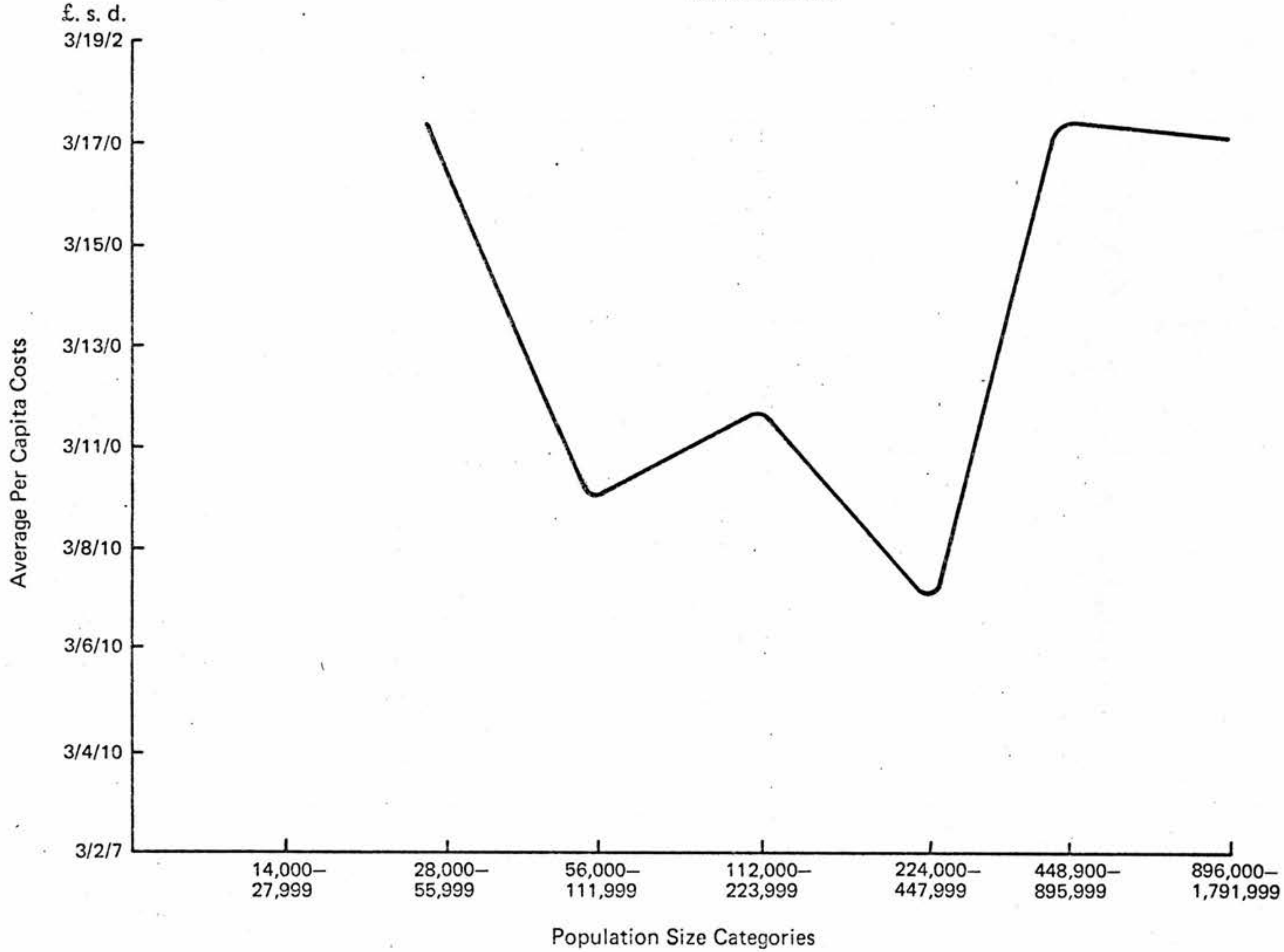


FIGURE 5
PUBLIC HEALTH
(As on Rate Fund Account)
111 Authorities

FIGURE 6
PUBLIC HEALTH
(As on Rate Fund Account)
83 Authorities



447,999 category, although in relative terms little real difference exists between the 224,000--447,999 category and the 112,000--223,999 group.

Figure 6, Public Health (83 Local Authorities) shows a somewhat different trend in terms of expenditure levels. There is the suggestion of a U-shaped function although not as distinctly as one would like. Only the County Boroughs were represented by this curve. Among those authorities with the highest level of self-determination, only the County Boroughs had data available on Public Health activities.

Beginning with the smallest population size group for which data were available, costs decline from the 28,000--55,999 category through the 56,000--111,999 group, rising slightly with the 112,000--223,999 category then dropping to the lowest level with the 224,000--447,999 group. Beyond this point costs rise through the next category only to dip very slightly with the last group, although the relative difference between the last two categories is insignificant.

Correlation tests were performed on the data relating to Figures 5 and 6. Some indication was shown by Figure 5 of a possible linear relationship.

A correlation coefficient of -0.109 was derived for Figure 5. The coefficient of determination was 1.18. The test performed on the data relating to Figure 6 yielded little improvement. A correlation coefficient of +0.06 was derived, again, a very negligible relationship. The coefficient of determination was even less explanatory than for Figure 5. Less than one-half of one percent of the variability among the local authorities in terms of per capita costs is explained in terms of population size.

These findings emphasize again the point made in regard to Education, which is that accounting for the variability among the local authorities as to differences in expenditure levels for Public Health is a multi-variate problem. It is not as simple as relating population to per capita costs.

Sewerage and Sewage Disposal. As was made clear in the previous section, Public Health has numerous provisions. Two of the more important are Sewerage and Sewage Disposal and House and Trade Refuse. Both are singled out for attention within this study due to their rather sensitive relationship to rates.

Public Cleansing, Public Lighting, the provision and maintenance of streets and roads along with Sewerage and Sewage Disposal constitute what Warren has referred to as the "Communal Services."[92] The case is made in referring to this group of services in this manner as one where "...all need them, all are served by them, and, on the whole, all use them as needed and pay for them collectively through the rates."[93] Except for certain road grants and grants for sanitation in landward areas all these services are supported almost exclusively at the charge of local rates.

The recognition of the necessity for a system of sewerage and drainage dates from the latter half of the Nineteenth Century. Many rivers and lesser streams in Britain had been

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[92] J. H. Warren, The English Local Government System (London: George Allen and Unwin, Ltd., 1964), p. 24.

[93] Ibid.

turned into open sewers. Such intolerable conditions gave rise to the need for a separate system for sewage disposal and drainage, one more in keeping with the newly emerging precepts of the science of hygiene. As a result of these actions, there have been established through the ensuing period of time many statutory provisions relating to sewerage and sewage disposal. Among the more important provisions are the following:

(1) Local authorities must provide a sufficient number of public sewers as are necessary for effectively draining its particular area or district; or they may adopt, and in certain cases must adopt, the sewers constructed by other persons;

(2) Every property owner or occupier is entitled to connect with any sewer on the condition that he gives notice of intention and complies with the council's regulations, and is subject to control by the council's appointed representative;

(3) In the event a house has a drain that is inadequate, the occupier may be required to provide one;

(4) And all new houses within local authorities are required to have adequate drainage.

If the overlapping and interconnection of the various Public Health activities are ignored, and only the integrational characteristics of the Sewerage and Sewage Disposal service considered, then it is an example of the vertically integrated form. Its purpose is to collect sewage, treat it, and dispose of it. An underground distribution system connects user and treatment facility. The service delivery process is unified through the various Public Health Acts and the controlling force for this unification is the local authority.

Once the growth of a municipality has reached the stage where adequate systems of Sewerage and Sewage Disposal as well as Drains are required, the initial costs are high on a per capita basis. Treatment plants require large outlays of capital. Once growth has progressed to the point that the burden of the service costs falls onto a larger population, then per capita costs decline. At some point, though, diminishing returns come into play and costs begin to rise. New or additional treatment facilities are required necessitating additional outlays of capital. At this point, following the theoretical formulation of the service expenditure function, the cost curve would begin to approximate the U-shape. If this functional relationship has any basis in fact, then the Sewerage and Sewage Disposal service is an excellent choice to test for this relationship as its costs are not influenced by sources of revenues other than rates. The service is virtually supported in its entirety by rates; and as increasing population is reflected by the local authorities included in this study, some indications of the functional relationship should emerge.

Shown in Figures 7 and 8 are cost-to-size curves for Sewerage and Sewage Disposal. Figure 7 represents the County Boroughs of England and Wales along with the Metropolitan Boroughs of London. These are the only local

TABLE VI

AVERAGE PER CAPITA COSTS
FOR SEWERAGE AND SEWAGE DISPOSAL

Size Category	Frequency Curve No. 1 Data Values	Frequency Curve No. 2 Data Values
	Per Capita Costs in £. s. d.	
7,000- 13,999	0. 0. 0	0. 0. 0
14,000- 27,999	0. 4. 4	0. 0. 0
28,000- 55,999	0.13.10	$\boxed{1.\ 3.10}$
56,000- 111,999	0.15. 3	0.17. 5
112,000- 223,999	0.15. 2	0.19. 4
224,000- 447,999	$\boxed{0.18.\ 6}$	1. 1. 6
448,000- 895,999	0.15.11	0.15.11
896,000-1,791,999	0.14. 5	0.14. 5

Lowest costs are underlined.
Highest costs are blocked.

Note: Where all zero values appear in the first column, this indicates that data were not available on Sewerage and Sewage Disposal for that size category. Where all zero values appear in the second column, this indicates that data for these size categories were not used in deriving the frequency curve.

FIGURE 7
SEWERAGE AND SEWAGE DISPOSAL
(As on Rate Fund Account)
111 Authorities

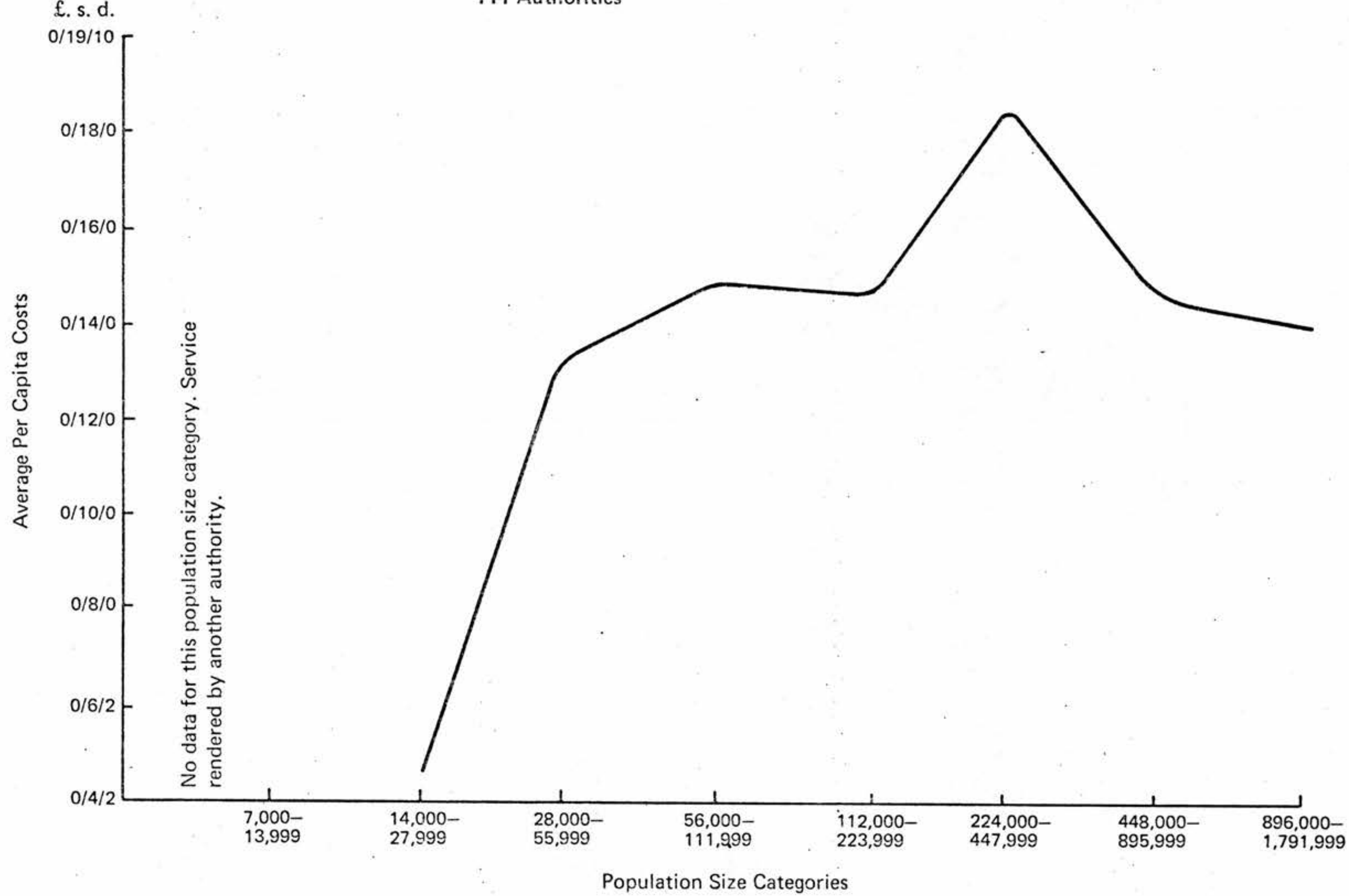
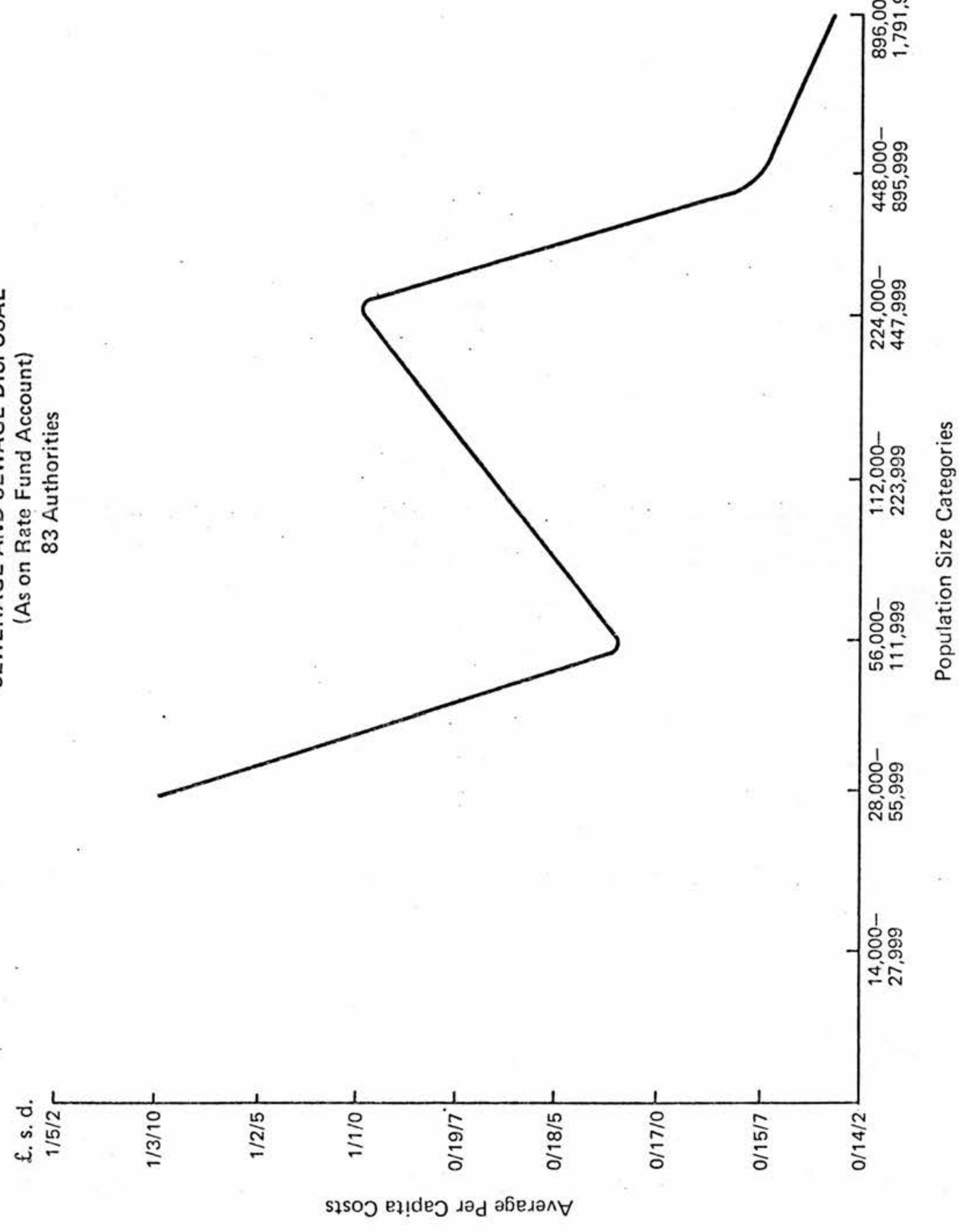


FIGURE 8
SEWERAGE AND SEWAGE DISPOSAL
(As on Rate Fund Account)
83 Authorities



authorities on which data relating to Sewerage and Sewage Disposal were available. In Figure 8 the Metropolitan Boroughs are not represented by the curve. They were dropped from consideration in the interest of the self-determination concern.

Figure 7, Sewerage and Sewage Disposal (111 Local Authorities), shows a condition where a general rise occurs in the costs of the service through the 224,000--447,999 category after which a slight decline occurs through the last two categories. This suggests an expenditure function which follows a more linear development than the hypothetical U-shape. Possibly the decline in costs shown with the last two population categories would not be as distinct were there more authorities. The suggested linear relationship between costs for Sewerage and Sewage Disposal and population size is not supported when the data are subjected to correlation testing. A coefficient of +0.034 resulted indicating virtually no relationship. Less than one percent of the expenditure variability among the authorities is accounted for in terms of population size.

The trend of the curve in Figure 8 is in contrast to Figure 7. Rather than costs rising from the smallest population groups, costs decline on a variable basis through the largest category. Fluctuations are found in this general trend with minor rises in costs, at least in absolute monetary amounts, with the 112,000--223,999 and 224,000--447,999 categories. When a correlation test was performed on the data, a coefficient of -0.042 resulted, and only a little more than one percent of the variability was explained in terms of population.

Just why there is such a marked difference from Figure 7 to Figure 8 is unclear. One can only conclude that other factors are influencing the trends of the curves and that based upon this analysis population size would appear to be unimportant as a variable. Certainly, differences in the scope and quality of the services cannot be ignored as possible influencing factors. Also, the overlapping and interdependency of the Public Health activities may be influencing factors.

House and Trade Refuse. House and Trade Refuse removal represents one of the more important functions included under Public Health. Yet it is a function that a local authority *may* undertake. In other words, the service does not have to be carried out by the authority itself; it can be contracted to the private sector of the economy. How widespread the contracted arrangements are among those local authorities included in this study is unknown to the author. This information is only obtainable either from a central government department or from the local authorities themselves. Whether the service is provided through the private sector or by the authorities themselves is relatively unimportant to this study. What is important is the manner in which the service is met in terms of expenditures.

The statutory provisions of this service are part of the larger provisions relating to Public Health and have their origins in like manner to Sewerage and Sewage Disposal. Legal difficulties, now satisfactorily resolved, have arisen from time to time over what constitutes "home refuse" and what is "trade refuse." One distinction that has been established is that the removal of house refuse is paid for collectively through rates, while such is not the case for trade refuse. Formerly, local authorities had the discretion whether to charge for the removal of trade refuse; now, however, authorities are required by law to make reasonable charges for removing this form of refuse.[94]

The collection and disposal of House and Trade Refuse follows the horizontal form of structural integration. It is a service with a large share of its expenditures going for overhead, i.e., personnel, administration, and equipment. The nature of a theoretical expenditure function for House and Trade Refuse is unclear. Proponents of the optimum city-size idea have argued the U-shaped one, while at least one author has suggested on the basis of empirical evidence that the true relationship is more of a linear one.[95]

Figures 9 and 10 show two cost-to-size curves on House and Trade Refuse. Figure 9, House and Trade Refuse (111 Local Authorities), reflects data on the County Boroughs and the Metropolitan Boroughs, whereas Figure 10, House and Trade Refuse (83 Local Authorities), reflects data only on the County Boroughs.

The relationship suggested by Figure 9 is one where as size increases costs decrease. A sharp decline occurs from the smallest population size category through the next

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[94]Ibid., p. 253.

[95]Hirsch, op. cit., p. 238.

TABLE VII

AVERAGE PER CAPITA COSTS
FOR HOUSE AND TRADE REFUSE

Per Capita Costs in £ . s. d.

Size Category	Frequency Curve No. 1 Data Values	Frequency Curve No. 2 Data Values
7,000- 13,999	0. 0. 0	0. 0. 0
14,000- 27,999	$\boxed{2.18.\ 4}$	0. 0. 0
28,000- 55,999	1. 4. 4	<u>0.15. 8</u>
56,000- 111,999	1. 2. 6	0.19. 0
112,000- 223,999	1. 0. 3	0.18. 5
224,000- 447,999	<u>0.18.11</u>	0.17.11
448,000- 895,999	1. 6. 0	1. 6. 0
896,000-1,791,999	1. 7. 3	$\boxed{1.\ 7.\ 3}$

Lowest costs are underlined.
Highest costs are blocked.

Note: Where all zero values appear in the first column, this indicates that data were not available on House and Trade Refuse for that size category. Where all zero values appear in the second column, this indicates that data for these size categories were not used in deriving the frequency curve.

FIGURE 9
HOUSE AND TRADE REFUSE
(As on Rate Fund Account)
111 Authorities

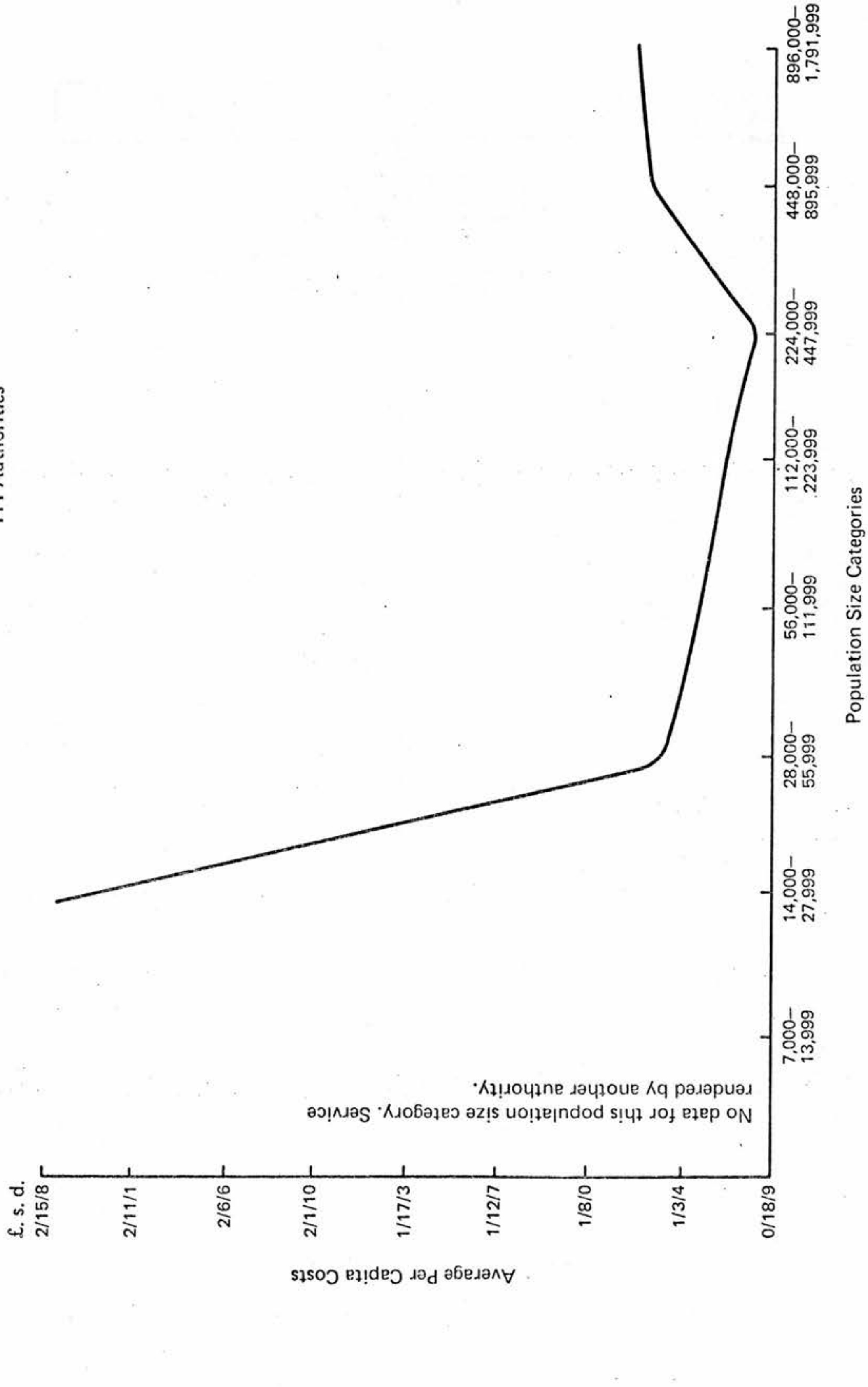
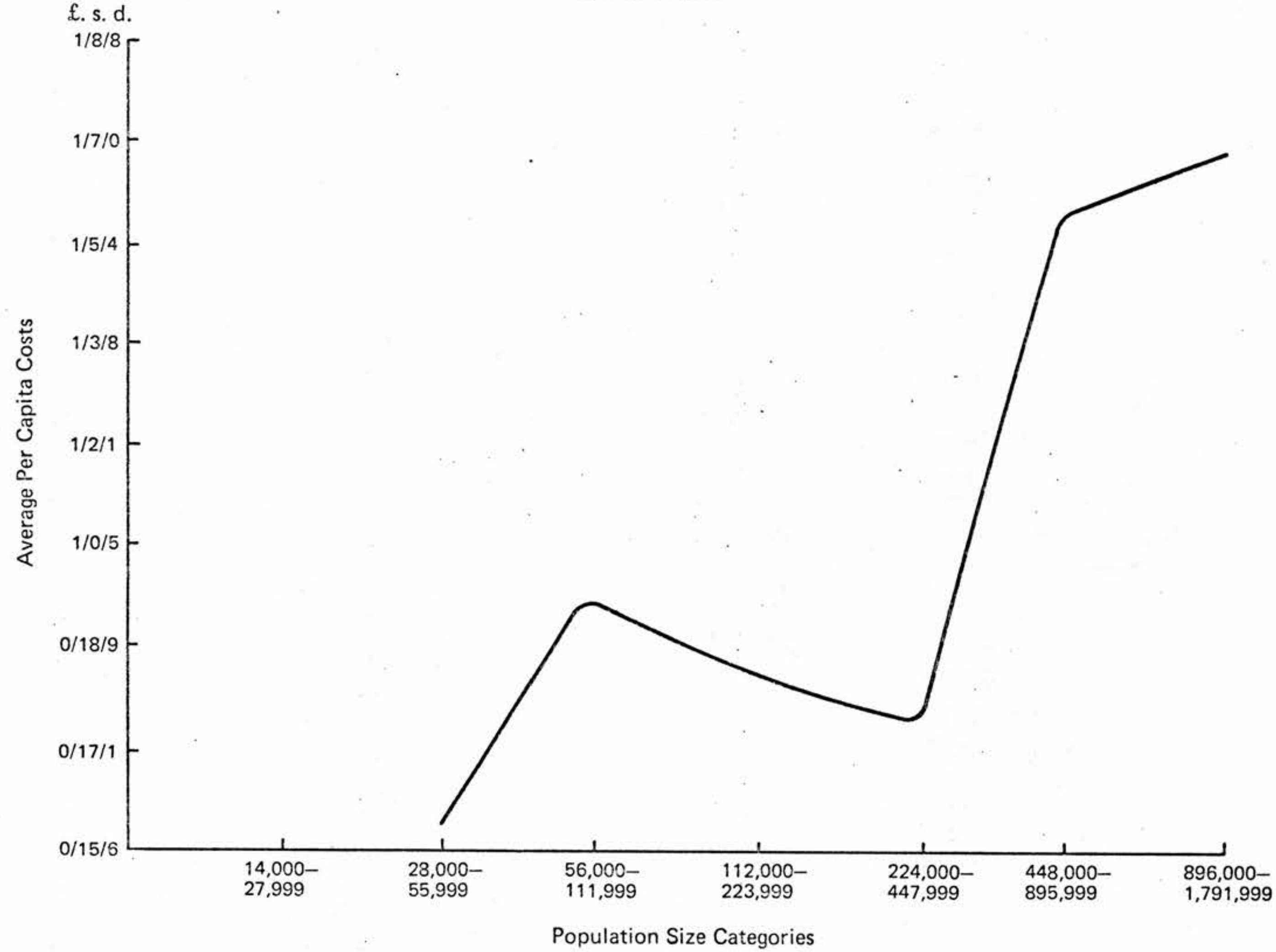


FIGURE 10
HOUSE AND TRADE REFUSE
(As on Rate Fund Account)
83 Authorities



population group followed thereafter by a steady decline through the 224,000--447,999 group with a slight rise reflected by the last two categories.

When only the cost curve for the County Boroughs is considered, the character of the curve changes when compared to Figure 9. Per capita costs are least with the smallest population size group, rising slightly up to the next category, dipping downward to the 224,000--447,999 group, and from this point rising sharply up to the 448,000--895,999 level with little distinguishing the absolute per capita amounts between the last two categories.

Simple correlation tests performed on the data for both figures on House and Trade Refuse revealed little in the way of a relationship. A coefficient of -0.018 resulted in the case of Figure 9 with a coefficient of determination of .0324. A slight relationship was found in the case of Figure 10. A correlation coefficient of +0.396 resulted with over fifteen percent of the expenditure variability related to population. For Figure 10 there is the suggestion that some degree of linearity exists between population and costs of the House and Trade Refuse services for the County Boroughs.

In looking for factors that help to further explain the variability among the local authorities as regards House and Trade Refuse, one must consider the nature of the service. Frequency of pickup, proximity of pickup location to buildings, and the nature of the equipment in use are the main ones to be considered. And all of these relate to the relative qualities of the service from one authority to another.

One additional factor that must be considered is the effects of other Public Health activities, especially at the administrative-coordination level, as regards costs for the House and Trade Refuse service. All the Public Health activities are interconnected and overlap to some extent.

Parks, Pleasure Grounds, and Open Spaces. Expenditures for Parks, Pleasure Grounds, and Open Spaces do not represent a very significant percentage of the total expenditures appearing on the Rate Fund Accounts of the local authorities. Something less than two percent is about average. If these functions can be thought of as forming a collective service, then it is one which might best be thought of for social betterment or the common good. In terms of the origins of these activities at the local authority level, they date essentially from the Public Health Amendment Act of 1890.[96]

As the title of the activities implies, Parks, Pleasure Grounds, and Open Spaces involves a variety of essentially recreational functions. There is a variety of service "units" unified through policy actions. So little attention has been given to the measurement of these activities in terms of expenditures and their supply and demand characteristics that any hypothetical expenditure function one offers is, to say the least, risky. Figures 11 and 12 show two cost-to-size curves for Parks, Pleasure Grounds, and Open Spaces. Figure 11, Parks, Pleasure Grounds, and Open Spaces (111 Local Authorities), reflects data on the County Boroughs of England and

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[96] Public Health Amendment Act, 1890.

TABLE VIII

AVERAGE PER CAPITA COSTS
FOR PARKS, PLEASURE GROUNDS, AND OPEN SPACE

	Per Capita Costs in £. s. d.	
Size Category	Frequency Curve No. 1 Data Values	Frequency Curve No. 2 Data Values
7,000- 13,999	0. 0. 0	0. 0. 0
14,000- 27,999	$\boxed{1. 0. 8}$	0. 0. 0
28,000- 55,999	0.15.10	$\boxed{0.19. 8}$
56,000- 111,999	0.14. 3	0.16. 2
112,000- 223,999	0.14.10	0.17. 7
224,000- 447,999	<u>0.13. 5</u>	<u>0.15. 0</u>
448,000- 895,999	0.16. 5	0.16. 5
896,000-1,791,999	0.17. 9	0.17. 9

Lowest costs are underlined.
Highest costs are blocked.

Note: Where all zero values appear in the first column, this indicates that data were not available on Parks, Pleasure Grounds, and Open Spaces for that size category. Where all zero values appear in the second column, this indicates that data for these size categories were not used in deriving the frequency curve.

FIGURE 11
PARKS, PLEASURE GROUNDS AND OPEN SPACES
(As on Rate Fund Account)
111 Authorities

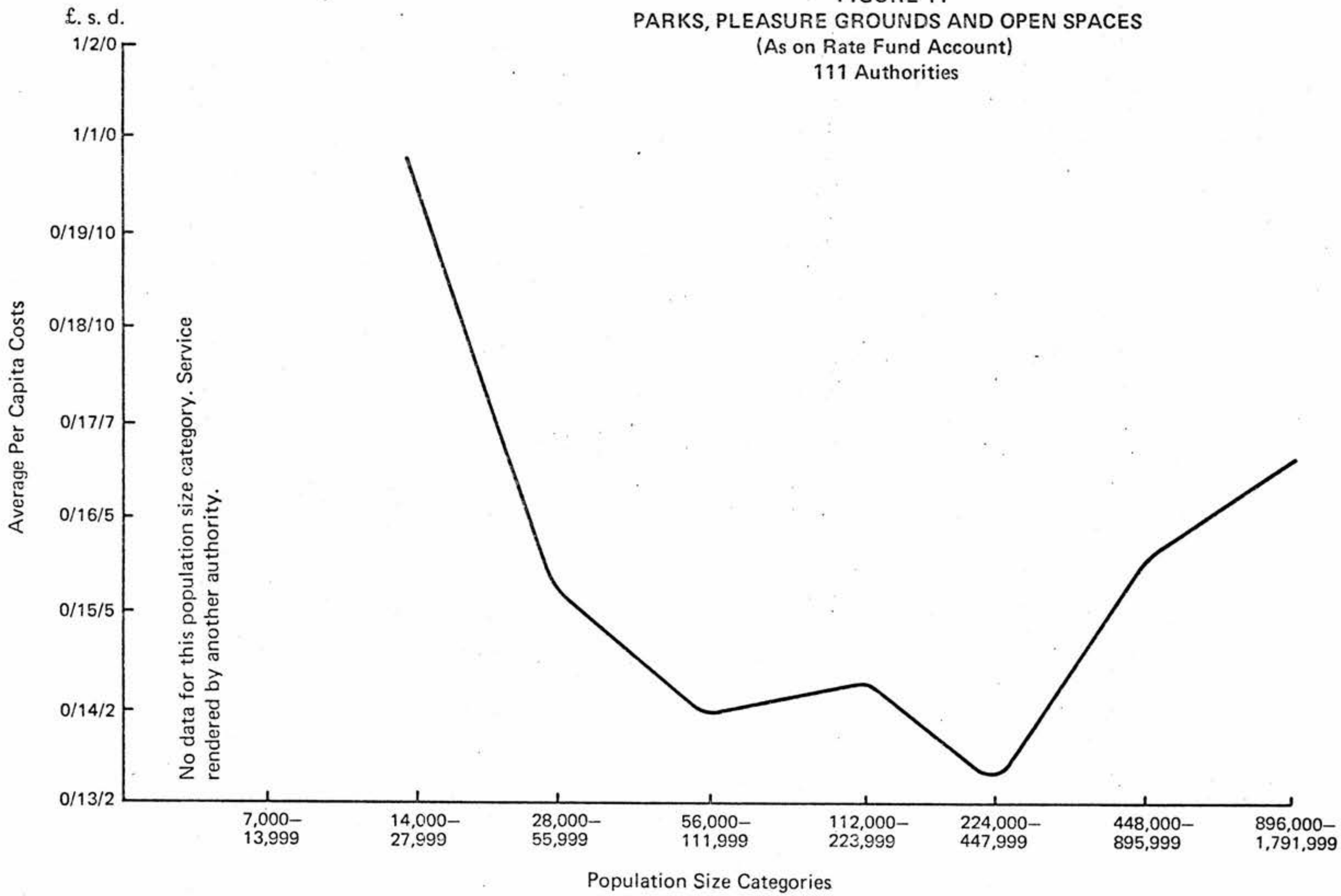
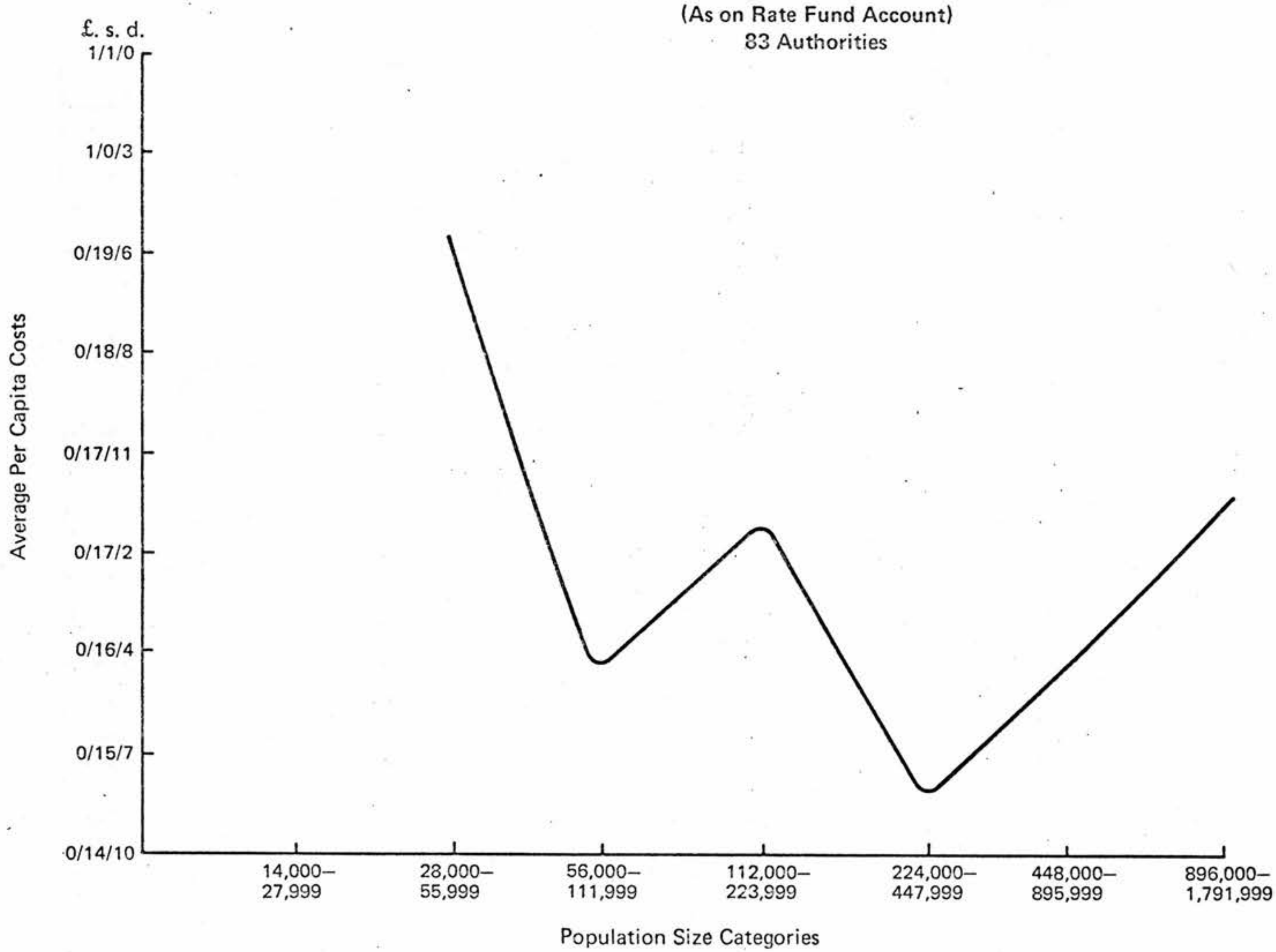


FIGURE 12
PARKS, PLEASURE GROUNDS AND OPEN SPACES
(As on Rate Fund Account)
83 Authorities



Wales as well as the Metropolitan Boroughs of London. Figure 12, Parks, Pleasure Grounds, and Open Spaces (83 Local Authorities), relates to data on only the County Boroughs. In both figures the general trend of the curves is one following a U-shape.

In Figure 11 costs are shown declining steadily from the smallest population size category down to the 112,000--223,999 group where a slight difference occurs by a rise in costs over the preceding group; thereafter, costs drop to the trough of the curve at the 224,000--447,999 population group. Beyond this point costs rise steadily with increasing population size.

In Figure 12 the same U-shaped characteristics are shown with the same minor distortions in the shape of the curve as in Figure 11. The smallest of the population size categories on which data were available (28,000--55,999) is the most costly. The least costly is the 224,000--447,999 category.

Both of these trend lines suggest only non-linear characteristics. This is substantiated by the simple correlation tests performed using the average per capita costs for Parks, Pleasure Grounds, and Open Spaces and the average population over the data record. For Figure 11 there were 111 authorities included and in Figure 12 only 83 were included. For the data on the 111 authorities a coefficient of correlation was derived indicating virtually no relationship (+0.025), and the coefficient of determination indicated that less than one percent of the expenditure variability is explainable in terms of the data for Figure 12.

One could argue on the basis of the expenditure curves shown in Figure 11 and 12 that Parks, Pleasure Grounds, and Open Spaces follows the hypothesized U-shape function. This would be a very risky conclusion. There are the possible effects due to the interrelatedness of many of the Public Health activities on expenditures for Parks, Pleasure Grounds, and Open Spaces that must be taken into account. Also, one must be concerned with differing standards of Parks, Pleasure Grounds, and Open Spaces from authority to authority. One would think that the smaller authorities would not be in a position to provide as good facilities as the larger ones. This assumption may not be borne out given an assessment of standards of facilities, and data relating to such an assessment are not readily available.

Protection of Children. The Protection of Children constitutes an omnibus function. In terms of a local authority activity, it has its roots in the Nineteenth Century where statutes were set relating to children working in factories and workshops, in coal mining as well as other similar types of activities. In 1908 all previous Acts were consolidated into one: The Children Act.[97]

While there have been numerous additional statutes passed since 1908, much of the philosophical basis for the protection of children dates from the omnibus characteristics of that Act. Further consolidations have subsequently taken place, notably in the Children and Young Persons Act, 1933.

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[97] The Children Act, 1908.

Among the duties carried out under Protection of Children are the care of deprived children, attention to the needs of foster children, the adoption of children, and provisions for remand homes and various other approved schools. Also, the care of mentally disordered children falls under this service. Other duties include prevention of cruelty, regulation of the employment of children, and the protection of children and young persons with respect to criminal and summary proceedings.

At the local authority level the duties pertaining to Protection of Children are for the most part carried out in the name of the Education authorities. Thus, responsibility for duties relating to this service falls only on the County Councils, County Borough Councils, and Joint Education Boards in England and Wales. In Scotland such responsibilities reside only with the County Councils and Town Councils of the Counties of Cities. As a result, only one cost-to-size curve was necessary for this service.

The Protection of Children service is much like Parks, Pleasure Grounds, and Open Spaces in terms of its supply and demand characteristics, and proposing an expenditure function is a very uncertain task. One can only argue the diminishing returns point proposed by the proponents of the optimum city-size idea. Based upon the appearance of the curve shown in Figure 13, caution should be exercised regarding acceptance of the U-shaped formulation.

Rather than following the U-shaped expenditure formulation, the trend of the curve in Figure 13 is one more where as population increases there is a corresponding rise in

TABLE IX

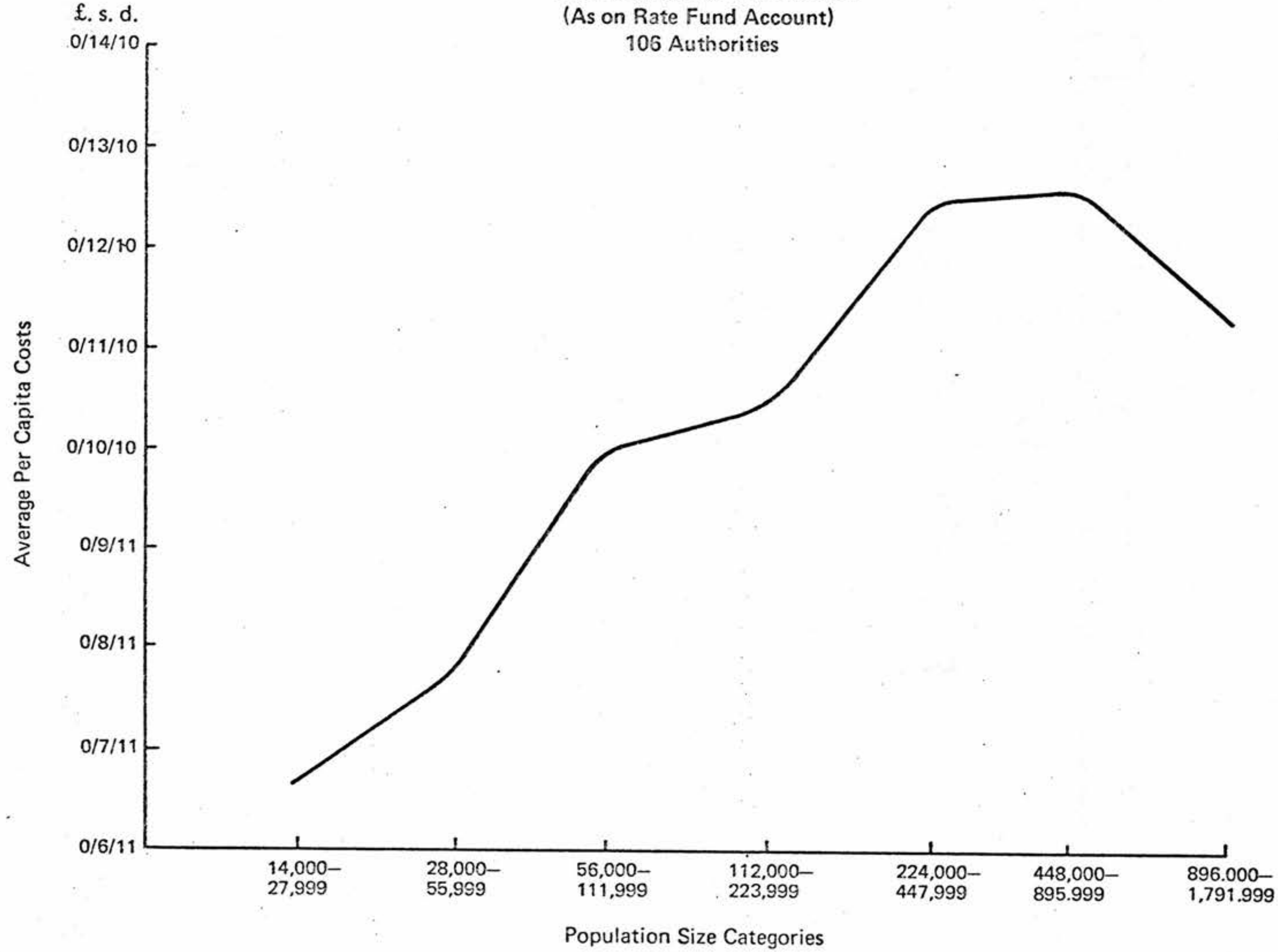
AVERAGE PER CAPITA COSTS
FOR PROTECTION OF CHILDREN

Size Category	Per Capita Costs in £. s. d. Frequency Curve Data Values
7,000- 13,999	0. 0. 0
14,000- 27,999	<u>0. 7. 1</u>
28,000- 55,999	0. 8. 9
56,000- 111,999	0.10.10
112,000- 223,999	0.11. 3
224,000- 447,999	0.13. 3
448,000- 895,999	$\boxed{0.13.\ 5}$
896,000-1,791,999	0.12. 2

Lowest costs are underlined.
Highest costs are blocked.

Note: Where all zero values appear in the above column, this indicates that data for this size category were not used in deriving the frequency curve.

FIGURE 13
PROTECTION OF CHILDREN
(As on Rate Fund Account)
106 Authorities



costs, although a falling off is indicated with the last population category. When subjected to statistical testing, this linear trend is supported, although one would have to say that the relationship is not very significant. The coefficient of correlation was +0.31 and the coefficient of determination was 9.61. This suggests that nearly 10 percent of the expenditure variability is related to population. However, much remains unaccounted for in terms of the causal aspects of the trends in expenditures among the various authorities providing this service.

In seeking for possible influencing factors on expenditures associated with the Protection of Children function, one must consider possible effects of overlapping and interrelatedness as a result of the function being primarily a matter of the Education activities. Also, the possibility that the scope of the service may vary from authority to authority.

Highways, Bridges, and Footpaths. The provision and maintenance of highways, bridges, and footpaths represents another of what Warren has designated as communal services. Motorways and trunk roads are the responsibility of the Minister of Transport (or, in Scotland, the Secretary of State); however, he can designate certain local authorities to act as agents of the Ministry.

In England and Wales a county council is the highway authority for all roads in its rural districts and for county roads in its non-county boroughs and urban districts. Non-county borough and urban district councils are the local highway authorities for all non-county roads within their areas; but if such a borough or urban district has a population of 20,000 or more, its council may claim for repair and maintenance purposes the local county roads. The council in effect then becomes the local highway authority for such "claimed" roads, but the county council must contribute to the cost of repair and maintenance.[98]

In Scotland the local authority for highways in the landward area of counties is the county council. The position in Burghs is more complex. The town councils of Large Burghs constitute local road authorities for all classes of roads. The Secretary of State has the power of classifying roads, and for purposes of determining which local authority is held responsible for their upkeep, they are usually classified into three categories. There are the main roads which connect important centres; there are connecting roads of lesser importance; and there are unclassified roads.[99] Not only can Large Burghs be held responsible for all classes of roads, but they are also responsible for streets and bridges in their areas. Small Burghs are responsible for all public streets and unclassified roads in their areas, but their functions in regard to classified roads are vested in the county councils.

The integrational characteristics of providing and maintaining highways, bridges, and footpaths does not follow clearly any of the three models. It has features associated

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[98]Jewell, op. cit., pp. 136-137.

[99]Ministry of Transport Act, 1919, s. 17.

with the horizontal form as well as the circular. In applying the U-shaped hypothetical expenditure function, one must argue that with growth local authorities must provide additional highways, bridges, and footpaths. As argued earlier in terms of other services, in the early stages of growth, per capita costs are relatively high, but with ensuing growth unit costs decline to a point where they are more advantageous. Beyond this point, costs rise and become increasingly more costly on a per capita basis.

Two cost-to-size curves are shown in Figures 14 and 15 which relate to Highways, Bridges, and Footpaths. Figure 14, Highways, Bridges, and Footpaths (165 Local Authorities), represents data on all local authorities included in the study with the exception of one. (Hawick is not included. Data were not available for it during the time period of the study.) Figure 15, by contrast, reflects data on the County Boroughs, the Counties of Cities, and the Large Burghs, or, in other words, those possessing the highest level of self-determination.

In Figure 14 there appears to be a tendency for an attenuated U-shape curve to emerge with the trough near the 224,000--447,999 population size group. A decline in costs begins with the smallest category, continues through the 28,000--55,999 group, rising to the 56,000--111,999 level and then dropping until the trough of the curve is reached. From the trough costs rise through the next population group only to drop again with the last category.

In Figure 15 there is much variability in terms of the levels of the expenditures per size category. Some indica-

TABLE X

AVERAGE PER CAPITA COSTS
FOR HIGHWAYS, BRIDGES, AND FOOTPATHS

Size Category	Frequency Curve No. 1 Data Values	Frequency Curve No. 2 Data Values
	Per Capita Costs in £. s. d.	
7,000- 13,999	2.10. 6	0. 0. 0
14,000- 27,999	2. 4. 9	1.16. 2
28,000- 55,999	2. 2. 1	1.15. 8
56,000- 111,999	2. 4. 9	1.19. 1
112,000- 223,999	1.19. 6	2. 1. 2
224,000- 447,999	1.14. 4	1.16. 6
448,000- 895,999	2.13. 9	2.13. 9
896,000-1,791,999	2. 1. 6	2. 1. 6

Lowest costs are underlined.
Highest costs are blocked.

Note: Where all zero values appear in the second column, this indicates that data for this size category were not used in deriving the frequency curve.

FIGURE 14
HIGHWAYS, BRIDGES, AND FOOTPATHS
(As on Rate Fund Account)
165 Authorities

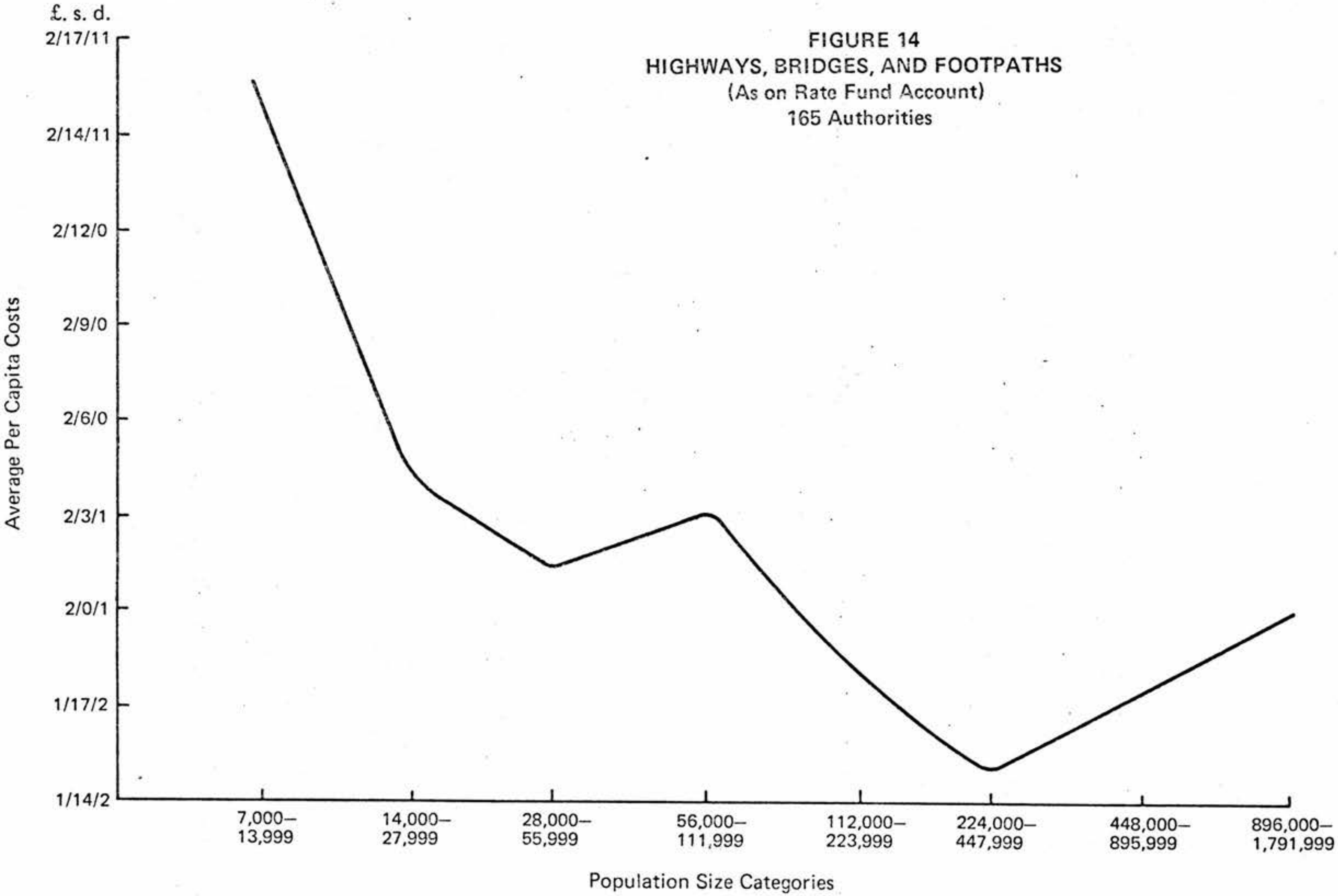
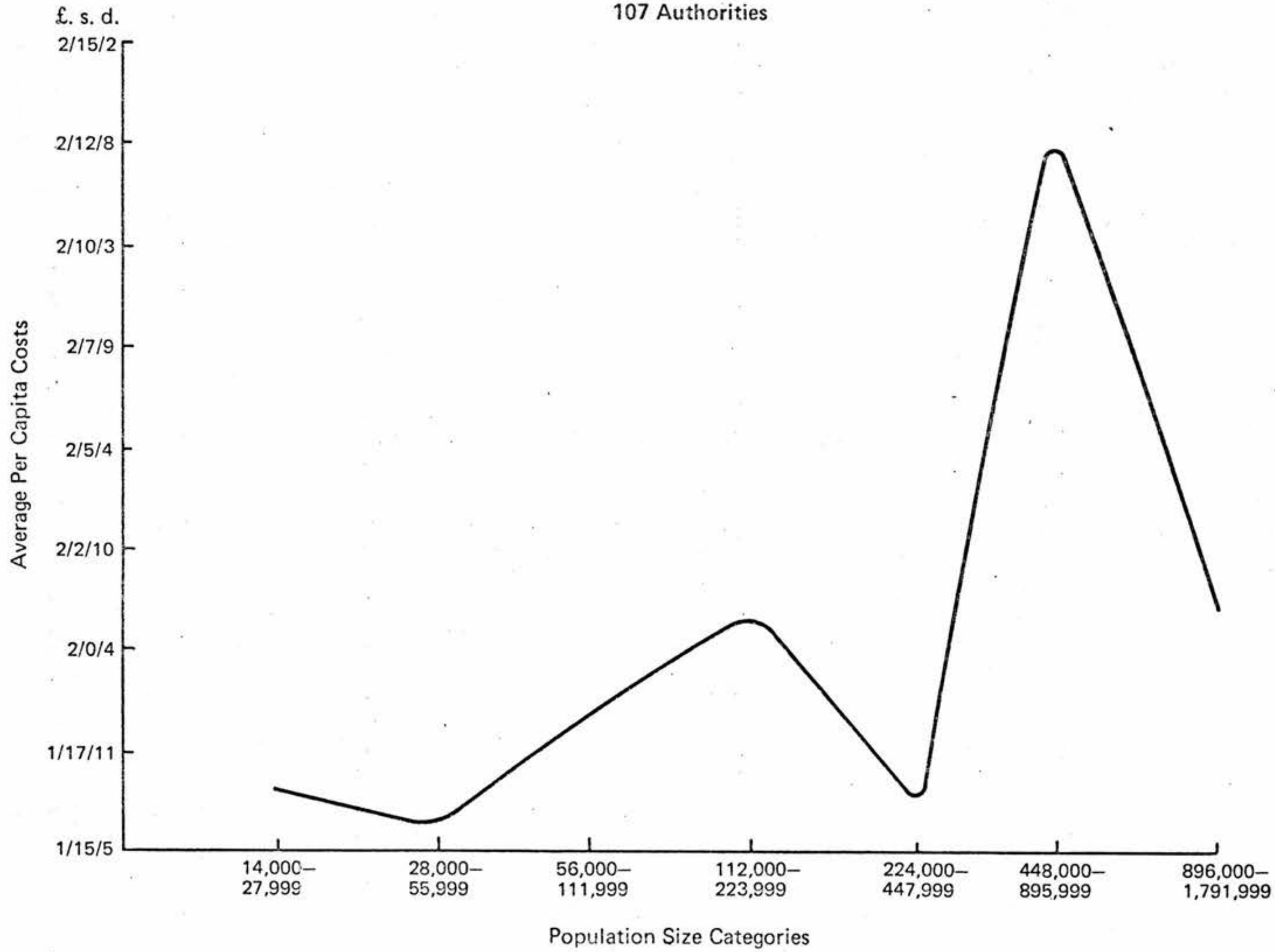


FIGURE 15
HIGHWAYS, BRIDGES, AND FOOTPATHS
(As on Rate Fund Account)
107 Authorities



tion is suggested by the first four population categories; however, beyond the 112,000--223,999 category costs rise and fall with no meaningful trend discernible.

Simple linear correlation tests performed on the data for both Figures 14 and 15 revealed nothing of any significance. The coefficient of correlation for Figure 14 was -0.062 with a coefficient of determination of 2.56.

From the foregoing examination one must conclude, like many of the services previously analyzed, the variability for costs of Highways, Bridges, and Footpaths among the various authorities included is more complicated than merely relating size of population to expenditures. One can cite numerous other dependent variables which may explain in combination the various levels of variability. For example, there are such factors as "standards of maintenance" used by authorities, total mileage of roads and streets maintained, expenditure per mile of the various classes of roads maintained, the degree to which mechanization is used in maintenance and the extent to which a local authority uses hired plant as against its own plant, etc. These are variables for which data either does not exist or, where available, they are of such a fragmentary nature that their use is very unreliable.

Public Lighting. Public Lighting is simply the lighting of streets in the local authorities, and as such it represents another example of what Warren has called a communal service. It is sustained almost exclusively at the charge of local rates.

In terms of its integrational characteristics, Public Lighting for the most part follows the horizontal model.

That is to say, the local authority controls a number of service units all furnishing a single service and unified through a common policy.

Public Lighting is a service common to all urban authorities. In applying the U-shaped optimum size hypothesis, it would be argued that the smaller authorities would have disproportionately higher levels of expenditures for this function than later with additional growth. As growth ensued, costs would decline on a per capita basis until the most advantageous point was reached, thereafter rising as diminishing returns came into play.

Figures 16 and 17 show cost-to-size curves for Public Lighting. One hundred and sixty-six authorities are represented by the curve in Figure 16, while only those designated earlier as having the greatest degree of self-determination are shown in Figure 17.

The relationship suggested by both of these curves is that of a distinct U-shape. In both the least costly population group is the 224,000--447,999 category, while the most expensive is the largest population group.

Nothing other than a non-linear relationship is suggested by these curves using average per capita expenditure figures and average population figures for each authority. Simple linear correlation tests were performed with the results that little if any relationship is found in terms of cost-to-size. The correlation coefficient for Figure 16 was -0.07 with a coefficient of determination of only 0.49. For Figure 17 the correlation coefficient was +0.107 and the coefficient of determination was 1.1449.

TABLE XI

AVERAGE PER CAPITA COSTS
FOR PUBLIC LIGHTING

Size Category	Per Capita Costs in £.s.d. Frequency Curve No. 1 Data Values	Per Capita Costs in £.s.d. Frequency Curve No. 2 Data Values
7,000- 13,999	0.15. 7	0. 0. 0
14,000- 27,999	0.16. 2	0.14. 7
28,000- 55,999	0.13.11	0.15. 0
56,000- 111,999	0.11. 4	0.10.10
112,000- 223,999	0. 9. 7	0.10. 2
224,000- 447,999	<u>0. 9. 0</u>	<u>0. 9. 1</u>
448,000- 895,999	0.14.10	0.14.10
896,000-1,791,999	$\boxed{0.17.\ 6}$	$\boxed{0.17.\ 6}$

Lowest costs are underlined.
Highest costs are blocked.

Note: Where all zero values appear in the second column, this indicates that data for this size category were not used in deriving the frequency curve.

FIGURE 16
PUBLIC LIGHTING
(As on Rate Fund Account)
166 Authorities

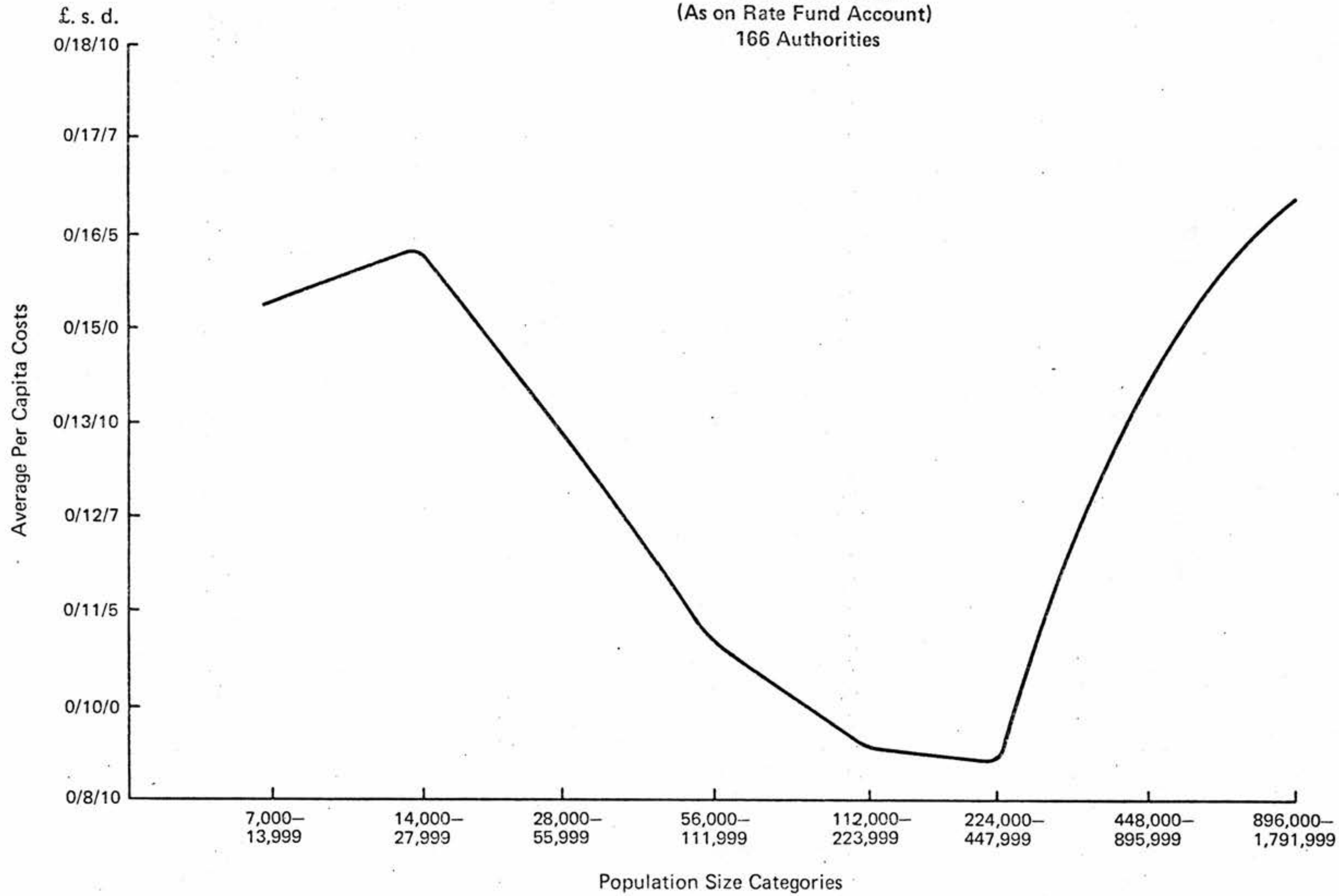
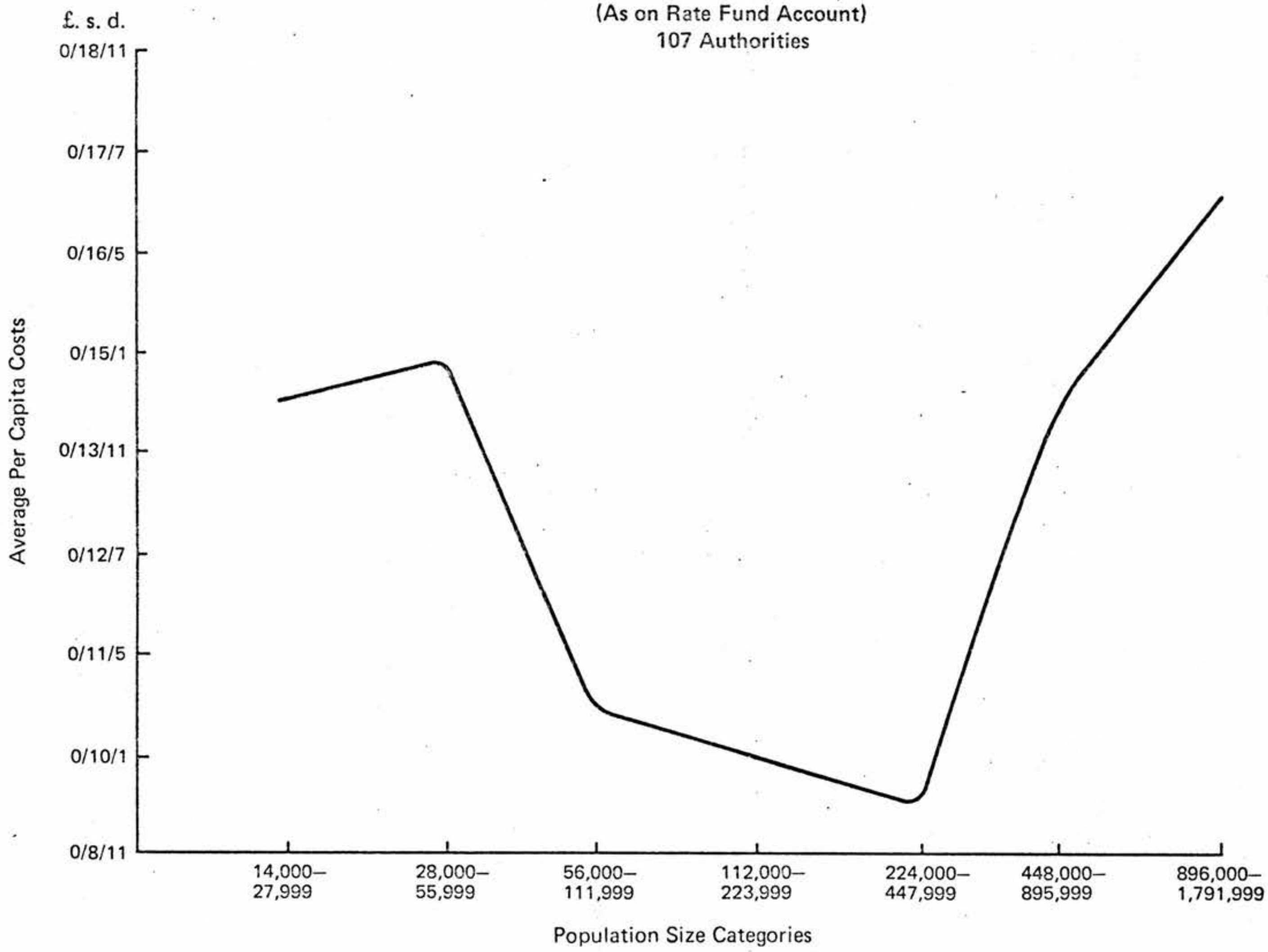


FIGURE 17
PUBLIC LIGHTING
(As on Rate Fund Account)
107 Authorities



Certainly there is little in terms of this analysis to suggest anything other than a more complex relationship in explaining the variability of cost levels for Public Lighting among the local authorities. The indication is that of a non-linear relationship with more independent variables necessary for accounting for the variation.

Fire Service. Prior to World War II, local authorities maintained their own fire protection service and were responsible for this service.[100] During the War years the local fire brigades were amalgamated and put under the central control through the National Fire Service. With the ending of the War the need for centralized control diminished. However, the local fire brigades did not return to their pre-War status: rather, a new administrative arrangement was adopted and implemented and today the conditions relating to the Fire Service are nationally determined and prescribed, but the conditions are applied, and the Forces administratively controlled, by the Local Authorities, subject to some overriding control by the Home Secretary, or, in Scotland, the Secretary of State through the Scottish Home Department.

Local authorities must provide and maintain a fire brigade, supportive equipment such as hydrants, fire alarms, and appliances. Also, provisions must be made for training personnel. Lands in support of the fire protection function

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[100]The Fire Brigades Act of 1938 for the first time imposed the statutory duty upon local authorities to make provision for the extinction of fires and the protection of life and property in case of fire whether by maintaining a fire brigade themselves or making arrangements with other authorities or by the use of voluntary bodies.

may be acquired compulsorily, and all necessary arrangements for accommodating equipment and personnel must be provided.

Within the various Acts regulating the Fire Service are provisions making it possible for local authorities to amalgamate to be more effective in carrying out the service. An example of this is the area arrangements adopted in Scotland as a result of the provisions contained in the Fire Service Act of 1947 and further amended by the Act of 1959. Ten combined areas have been established within the country incorporating combinations of counties and burghs.[101] Two examples of these combined areas are Lanark, comprising the County of Lanark and the Large Burghs therein, including Rutherglen, but not Glasgow and the South-Eastern combine, comprising the counties of Berwick, East Lothian, Midlothian, Peebles, Roxburgh, Selkirk, and West Lothian, and the city of Edinburgh.

Costs for Fire Service are met in part through rates and in part through grants in aid of rates made by central authorities. Prior to 1958 half of the costs of the service at the local level were met by the State. This grant provision was withdrawn in 1958. Today the Fire Service is indirectly subsidized by the General Grant in aid of local rate funds.[102] This subsidization is as a result of what Drummond has described as a "...general process of tidying up..."[103] as a

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[101]Miller, op. cit., pp. 266-267.

[102]Warren, op. cit., p. 24.

[103]Drummond, op. cit., p. 116.

result of the Local Government Act of 1958. Many grants formerly paid toward the cost of specific services were discontinued and support was given in an indirect manner through a General Grant based upon estimated expenditure on the services formerly aided by specific grants.

The integrational characteristics of the Fire Service are clearly of the horizontal form. However, the unification of the service by way of policy is a shared responsibility between local authorities and central authorities; while primary responsibility for administering the Fire Service lies with local authorities. Various Acts confer on the Secretary of State (Secretary of State in Scotland acting through the Scottish Home Department) certain regulation-making powers, especially with regard to personnel matters that have a bearing on the unification of the service. For example, the Fire Service (Appointments and Promotion) Regulations govern the method of appointment of chief officers of fire brigades and the qualification for appointment and promotion generally. So that the Secretary of State can obtain information as to the way in which fire authorities carry out their functions, the Crown appoints Inspectors of Fire Brigades.

So little interest has been shown by researchers as to the expenditure characteristics of urban services, more specifically, the Fire Service, until very little is known about the probable expenditure function. One can argue deductively that so many firemen are needed for a given number of population in a community. At least one fire station is necessary for the service to exist. Whether the station is physically located in a given community is a question of the efficiency with which the service is carried out and the importance that centrality has on the service. Fire Service is especially sensitive to time-distance relationships; and, therefore, total area served by a station is an important factor in the efficiency of the service.

Figures 18 and 19 show cost-to-size curves for the Rate Fund portion of expenditures on Fire Services. Figure 18, Fire Service (127 Local Authorities), relates to data on the County Boroughs of England and Wales, the Counties of Cities of Scotland, and certain of the Large and Small Burghs of Scotland.[104]

Figure 19, Fire Service (106 Local Authorities), reflects data on the County Boroughs, the Counties of Cities, and the Large Burghs of Scotland with the exception of Motherwell-Wishaw. Data on Motherwell-Wishaw were not available during the data period.

The shape of both curves on Fire Service is similar. From the smallest population category, costs rise through the 56,000--111,999 group. A slight decline in expenditure levels is shown in Figure 18 between the 14,000--27,999 group and the 56,000--111,999 category, but this is rather minor. Beyond the 56,000--111,999 level, costs decline in both curves with the basic trend in the last five categories that of a U-shape. The most expensive category in both figures is the 56,000--111,999.

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[104]Only those Large and Small Burghs with data available on the Rate Fund Accounts were included.

TABLE XII

AVERAGE PER CAPITA COSTS
FOR FIRE SERVICE

	Per Capita Costs in £.s.d.	
Size Category	Frequency Curve No. 1 Data Values	Frequency Curve No. 2 Data Values
7,000- 13,999	0.11. 6	0. 0. 0
14,000- 27,999	0.12.11	0. 9. 5
28,000- 55,999	0.11. 9	0.11. 9
56,000- 111,999	0.15. 4	0.15. 4
112,000- 223,999	0.13. 7	0.13. 7
224,000- 447,999	0.12. 2	0.12. 2
448,000- 895,999	0.12. 1	0.12. 1
896,000-1,791,999	0.14.10	0.14.10

Lowest costs are underlined.
Highest costs are blocked.

Note: Where all zero values appear in the second column, this indicates that data for this category were not used in deriving the frequency curve.

FIGURE 18
FIRE SERVICE
(As on Rate Fund Account)
127 Authorities

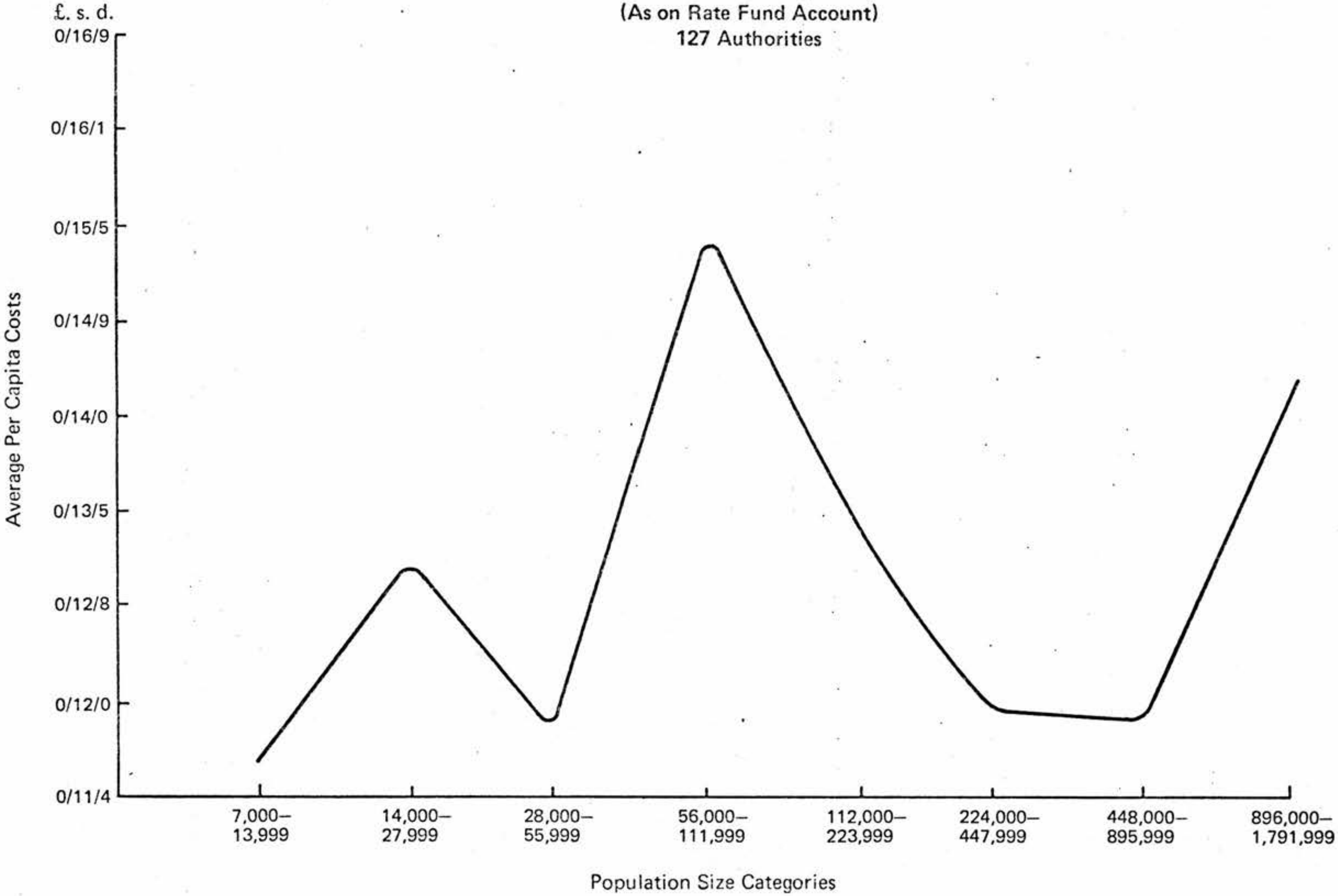
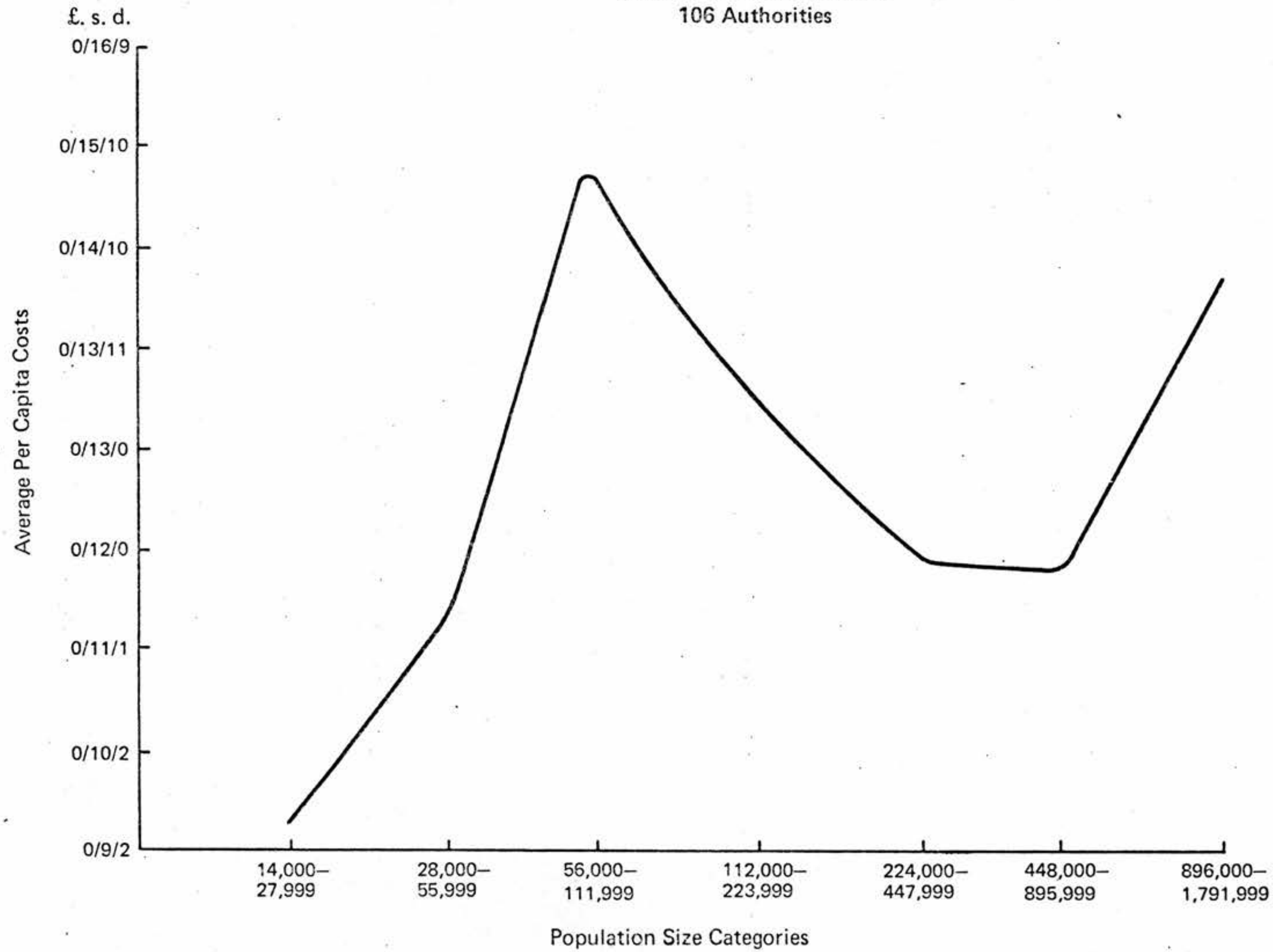


FIGURE 19
FIRE SERVICE
(As on Rate Fund Account)
106 Authorities



When the data for Figures 18 and 19 were subjected to simple correlation testing nothing other than a non-linear relationship is suggested. For Figure 18 a coefficient of correlation resulted of +0.058 with a coefficient of determination of 0.33. For Figure 19 the coefficient of correlation was +0.047 with a coefficient of determination of 0.22.

One can only conclude from this examination of expenditure levels among the local authorities for Fire Service that other factors are at work in accounting for the differences in costs among the various authorities other than population size. Some of the more plausible factors are: area served; density of dwelling units; night-time population versus day-time population; differences in equipment; number of firemen for each increment of population; and available rates revenue.

Police. The word "police" carries two connotations in terms of local government activities. The widest connotation is where functions of this nature relate to the regulations made in any town or city for the administration of the community. The more restrictive usage of the term refers to the enforcement of law and order. One might say that the latter connotation is the one most commonly used by the public. It is with this latter connotation that the subject of Police functions will be treated in this section.

The Central Authority for Police in England and Wales is the Home Secretary, while for Scotland it is the Secretary of State. In England and Wales the primary local authorities for Police functions are the Counties and County Boroughs, although in the London area provisions have been made for consolidated or amalgamated arrangements. In Scotland a police force is maintained for every county and also for each of the burghs mentioned in the First Schedule to the Police (Scotland) Act of 1956. Of the burghs so mentioned some are part of amalgamation schemes presently in force.[105]

Police activities are similar to the Fire Services in that the conditions which govern them are nationally determined and prescribed. The only real difference in these conditions relates to the manner in which central authority support is given. Unlike Fire Services, where subsidization of the functions indirectly through the General Grant provisions, Police activities are subsidized by a specific grant from the state at a level of one-half the local costs for the function. The remaining half is met largely through rates revenue.

Police organization follows the horizontal model of integration. Policies set at the national and local level form the basis of unification. Like Fire Services, very little is known about the character of the expenditure function for Police. One can only argue on deductive grounds that the shape of the curve possibly follows a U-shape. This argument is presented on the grounds that costs should be high in the early stages of city development, declining as scale of operations broaden, and turning upward with increased size. Where the "optimum" position would appear on the curve in terms of population size is undetermined.

Shown by Figures 20 and 21 are two cost-to-size curves

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[105]Miller, op. cit., pp. 262-263.

TABLE XIII

AVERAGE PER CAPITA COSTS
FOR POLICE

Size Category	Per Capita Costs in £.s.d. Frequency Curve No. 1 Data Values	Frequency Curve No. 2 Data Values
7,000- 13,999	1. 4. 2	0. 0. 0
14,000- 27,999	1. 5. 2	0.19. 0
28,000- 55,999	1.17. 6	1.17. 6
56,000- 111,999	2. 5. 6	2. 5. 6
112,000- 223,999	2. 9.10	2. 9.10
224,000- 447,999	2. 6. 4	2. 6. 4
448,000- 895,999	3. 3. 8	3. 3. 8
896,000-1,791,999	$\boxed{3.\ 5.\ 5}$	$\boxed{3.\ 5.\ 5}$

Lowest costs are underlined.
Highest costs are blocked.

Note: Where all zero values appear in the second column, this indicates that data for this category were not used in deriving the frequency curve.

FIGURE 20
POLICE
(As on Rate Fund Account)
133 Authorities

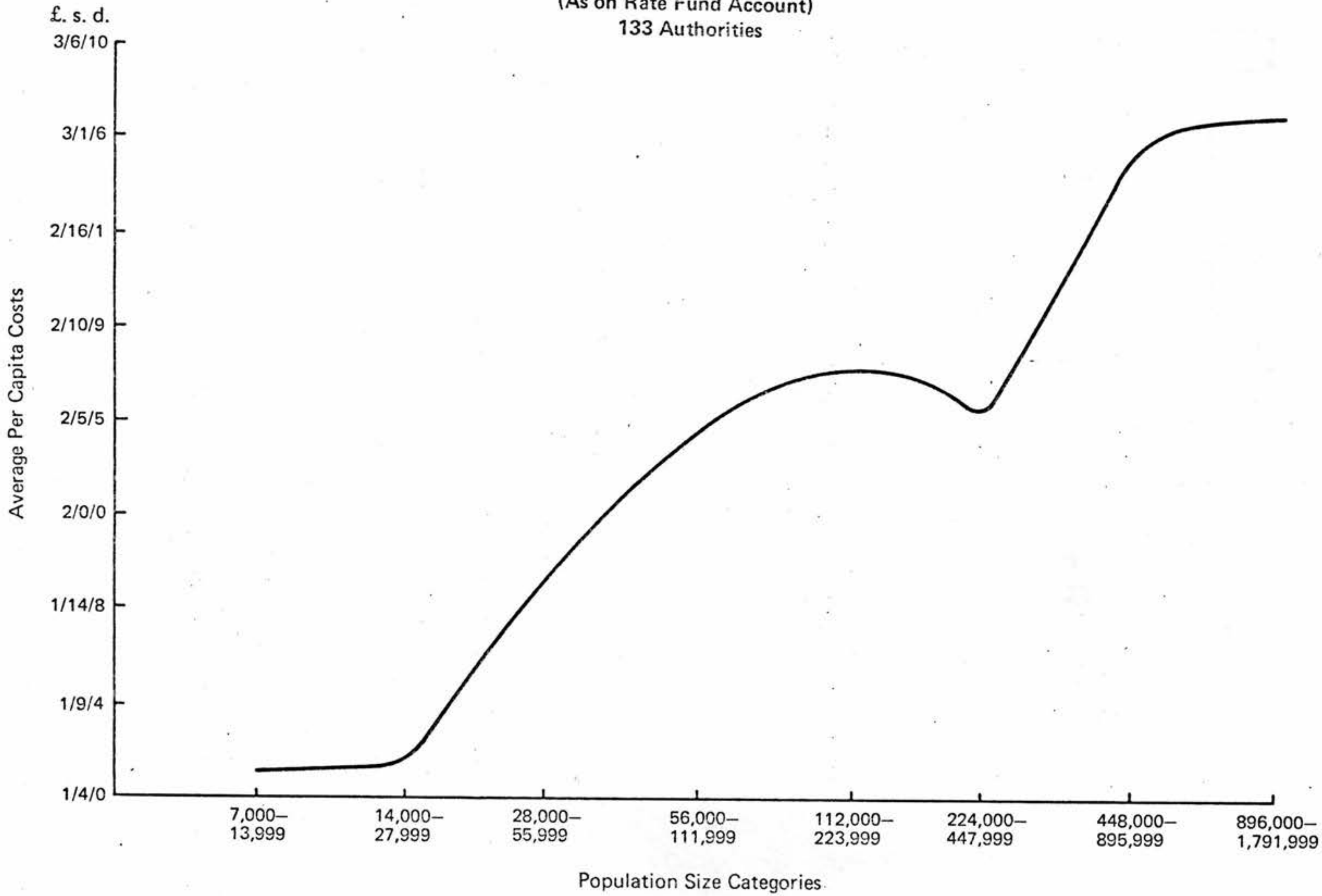
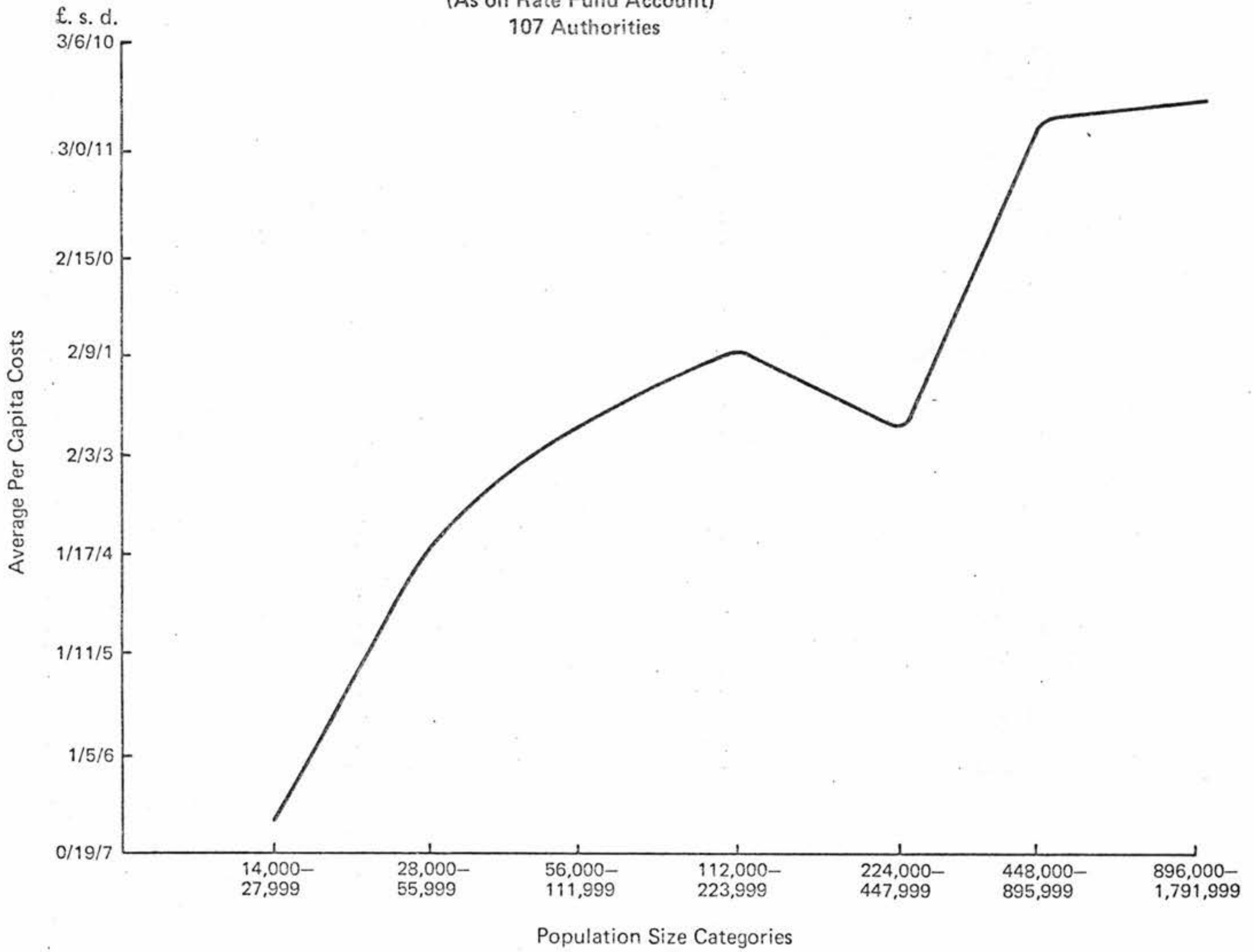


FIGURE 21
POLICE
(As on Rate Fund Account)
107 Authorities



on Police. Figure 20, Police (132 Authorities), represents data relating to the County Boroughs, with the exception of West and East Ham, which are parts of larger amalgamations, the Counties of Cities in Scotland, as well as the Large Burghs of Scotland. Certain of the Small Burghs of Scotland are included. These are those for which data were available on the Rate Fund Accounts.

Figure 21 represents only data relating to the County Boroughs, except West and East Ham, the Counties of Cities and the Large Burghs.

Both curves suggest that with increasing size in terms of population there is a corresponding increase in costs. Both suggest a linear relationship, and this is supported in terms of statistical tests. When simple correlation tests were performed on the data relating to both curves, a substantial relationship resulted for both sets of data. A coefficient of correlation of +0.521 resulted in the case of Figure 20 with a coefficient of determination of 27.1441. For Figure 21 the correlation coefficient was +0.447 with a coefficient of determination of 19.9809.

While one can conclude that much of the variation in expenditure levels relating to Police is a function of increasing size, there is a considerable percentage of the variation unaccounted for. Many of the factors suggested as possibly affecting the variations in costs on Fire Service also apply for Police. Night-time population, total mileage of streets, and night-time population density per unit area are all possible influencing factors. As was the case with Fire Service, each of these in some way relates to scope of service and quality differences.

B. Total Expenditures

In the foregoing examination of expenditure levels on individual services, the primary concern was to ascertain trends in terms of costs by service. Primary focus was put upon determining trends of costs by service across the various types of local authorities as well as trends in terms of the local authorities possessing the highest level of self-determination. In general, where data availability permitted, these objectives could be achieved on an individual service basis. However, where total expenditures on the Rate Fund Accounts are concerned, there is the necessity for using a different set of requirements for analysis. The reasons why this difference in approach is necessary are explained below.

As is shown by the data record in Appendix C, many of the local authorities do not have data listed on the Rate Fund Accounts for certain of the individual services. Either they are not empowered to provide the services or the services are provided by another governmental unit. By way of illustration, data on Public Health, Sewerage and Sewage Disposal, House and Trade Refuse, along with Parks, Pleasure Grounds, and Open Spaces, are uniformly absent from the Abstracts of Accounts for the Large and Small Burghs of Scotland. This is also true for the Counties of Cities. Furthermore, for some of the Large and Small Burghs data on Protection of Children; Highways, Bridges and Footpaths; Public Lighting; Education; Police; and Fire Service are not on the Rate Fund Accounts. One also finds that data on Education, Protection of Children, Fire Service, and Police are uniformly absent on the Epitomes of Accounts for the Metropolitan Boroughs of London. The County Boroughs of England and Wales represent the only group of local authorities that is uniform with respect to type of authority and on which data on the individual services examined in Section A are complete. For this reason the examination of Total Expenditures for local authorities primarily concerns the data relative to the County Boroughs. To include the other authorities would unduly affect the analysis. This can be shown by a consideration of Figure 22.

Figure 22 reflects per capita amounts of total expenditures as given on the Rate Fund Accounts for the County Boroughs, the Counties of Cities, and the Large Burghs. On the basis of plotting the data, average per capita expenditures versus population size, one gets the impression that there is a distinct linear trend in terms of costs. It must be recognized, however, that the data on the Counties of Cities and the Large Burghs are not commensurate with those on the County Boroughs. Many of the services on which data are reflected on the County Boroughs are not included for the Counties of Cities and the Large Burghs. When data on Total Expenditures for the County Boroughs are plotted alone, the shape of the curve, Figure 23, is very much in contrast to that shown in Figure 22. Rather than a linear trend, there is a distinct U-shaped non-linear trend. Due to the stark differences in the trends of these two curves, to eliminate as much as possible the effects of incomplete data,

TABLE XIV

AVERAGE PER CAPITA COSTS
TOTAL EXPENDITURES

Per Capita Costs in £.s.d.

Size Category	Frequency Curve Data Values
28,000- 55,999	$\boxed{39.14.\ 5}$
56,000- 111,999	35.12. 6
112,000- 223,999	<u>35.10. 7</u>
224,000- 447,999	35.13.10
448,000- 895,999	38. 6. 3
896,000-1,791,999	38. 8. 5

Lowest costs are underlined.
Highest costs are blocked.

FIGURE 22
TOTAL EXPENDITURES–RATE FUND ACCOUNT
107 Authorities

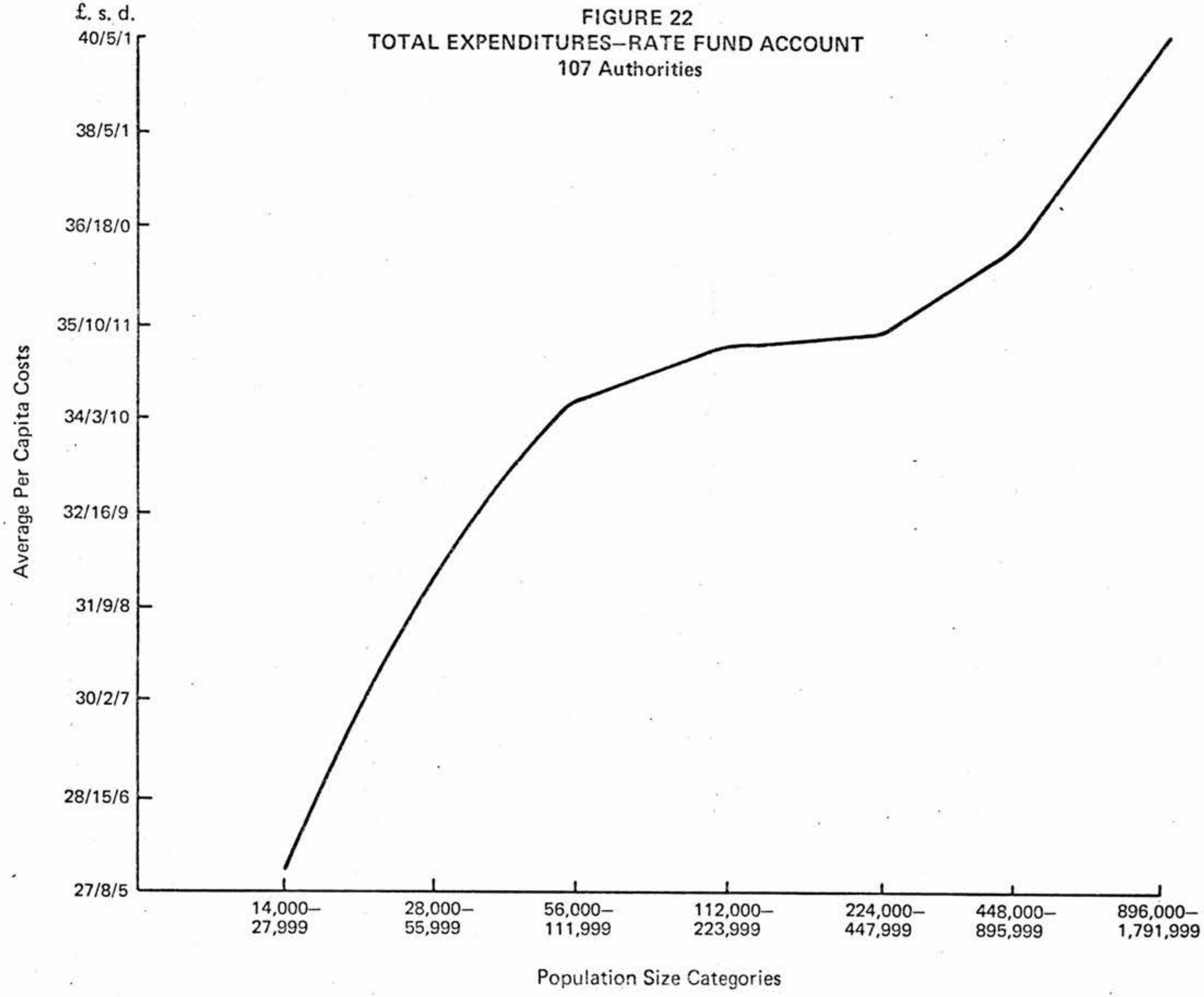
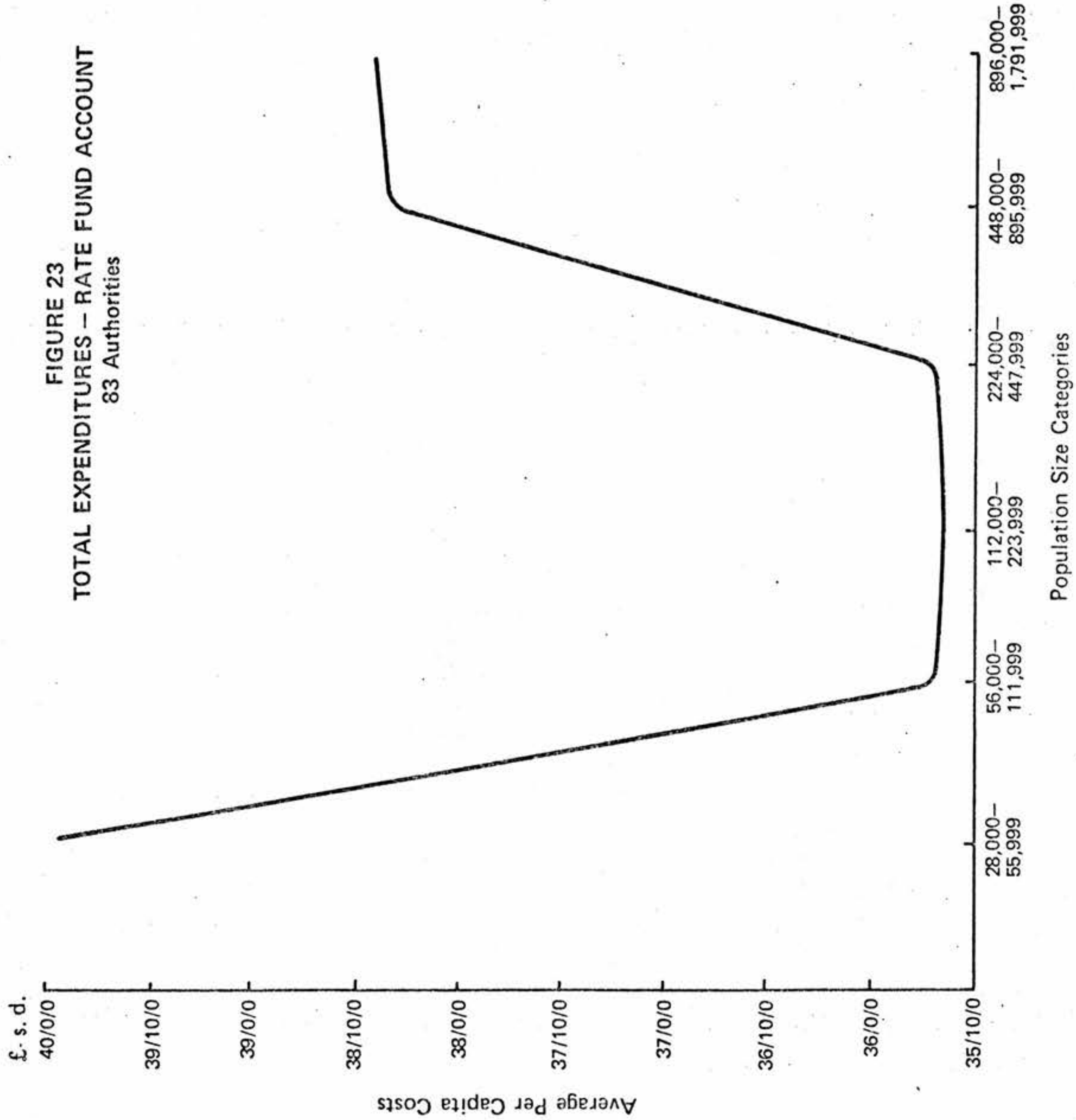


FIGURE 23
TOTAL EXPENDITURES – RATE FUND ACCOUNT
83 Authorities



only the County Boroughs are considered in the analysis where Total Expenditures are concerned.

Figure 23 indicates a distinct U-shaped curve for Total Expenditures appearing on the Rate Fund Accounts of the County Boroughs. Costs decline from the smallest population grouping, 28,000--55,999, through the 112,000--223,999 category, which represents the least expensive size range. From the 112,000--223,999 category, costs rise through the remaining categories. Nothing other than a non-linear relationship was revealed as a result of a simple correlation test. A coefficient of correlation of +0.15 emerged with a coefficient of determination of .022.

In an attempt to explain more of the variability among the County Boroughs, seven additional independent variables were identified and included with population in a multiple regression and correlation analysis with per capita costs the dependent variable. Characteristics were selected as variables on which data were available on an inter-authority basis. Those variables selected are as follows:

X_1. Population (Census Year--1961)

X_2. Intercensal Population Change (1951-1961)

X_3. Area (Acres)

X_4. Population Density

X_5. Job Ratio

X_6. Per Capita Retail Sales

X_7. Per Capita Rateable Value

X_8. Ratio of Revenues on Rate Fund Accounts to Income as a Function of Rates

X_9. Per Capita Total Expenditures on Rate Fund Accounts

Some explanation is required as to what is meant by certain of these characteristics, their importance, and how they were derived.

Population. Rather than the average population figures used in the case of the service by service inspection of expenditures, only the 1961 enumerated census data were used in the multiple regression and correlation test. This was deemed necessary inasmuch as data for other variables were only available for 1961, and primary concern was given to keeping the data as compatible as possible.

Population Change. As used here, population change refers to the net loss or gain in population by County Borough during the inter-censal decade 1951-1961 and is expressed as a percentage.

Area. Area refers, in this instance, to the acreage of land included in the corporate limits of each authority.

Population Density. Population density is an expression of people to land area and was derived by dividing local authority land area into population.

Job Ratio. This expression relates the 1961 enumerated occupied population within the individual County Boroughs to the net daily inflow or outflow of population constituting the work force. It serves as an indicator of the relative influence, if any, of commutation on per capita total expenditures. Job Ratio was derived as shown below:

$$\frac{\text{Enumerated occupied population}}{\text{Population working in area}} \times 100$$

Retail Sales. This expression is an indication of the degree of commercial development in the individual County

Boroughs. As derived it is expressed in a per capita sense, i.e.,

$$\frac{\text{Total retail sales on annual basis (1961)}}{\text{Total population}} = \text{Per capita levels}$$

Rateable Value. This expression relates to potential levels of revenues as a function of local taxation.

Ratio of Revenues on Rate Fund Accounts to Income as a Function of Rates Return. This ratio relates total revenues on the Rate Fund Accounts regardless of sources, e.g., grants, service charges, etc., to that portion accruing as a function of rates returns. It gives an indication of the relative dependency of local authorities on sources of revenue other than those derived by rates. The expression was derived in the following manner:

$$\frac{\text{Total revenues on Rate Fund Account}}{\text{Income on Rate Fund Accounts as a Function of Rates}} \times 100$$

The multiple regression analysis proceeded in two steps. The first step was concerned with establishing relationships in a linear manner. The second part was concerned with accounting for non-linear relationships. Before discussing the findings of this analysis, a description of the general characteristics of the machine program employed in the analysis is required.

A stepwise regression program was used. In the program a sequence of multiple linear regression equations was computed in a stepwise manner. At each step one variable was added to the regression equation. The variable added at the

the first step was the one which made the greatest reduction in the error sum of squares. Equivalently it was the variable which had the highest partial correlation with the dependent variable. Subsequent variables were added in a like manner to the first. However, a provision of the stepwise program was that variables could either be included within the equation or be excluded from it. The value level for any one variable to be included had to be 0.01. For a variable to be deleted from the regression equation, the value had to be 0.005 or less. See Appendix D for program printouts.

The results of the first part of the analysis can be seen on Table XV, the correlation matrix of the nine original variables. The combined relationship of these variables yielded a coefficient of multiple correlation of +0.5099 with a coefficient of determination of 0.26. Those variables yielding the highest level of explanatory power were, in order of importance, Job Ratio, Ratio of Total Revenue of Rate Fund Accounts to Income on Rate Fund Accounts as a Function of Rates, Area, and Rateable Value. The least important in terms of its explanatory power was Population, followed in order of rising importance by Population Change, Population Density, and Retail Sales.

The second step in the analysis was based on transgeneration of the original independent variables, that is to say, transformations were performed on the original variables in an attempt to raise the multiple correlation coefficient (R) and the coefficient of determination (R^2). All the original independent variables were transgenerated to Log^{10}, with the exception of Population Change. In logging the variables

TABLE XV

CORRELATION MATRIX FOR THE COUNTY BOROUGHS
OF ENGLAND AND WALES
(Nine Variables)

		1	2	3	4	5	6	7	8	9
Population	1	1.000	-0.125	0.881	0.335	0.155	0.584	0.059	-0.198	-0.168
Population Change	2		1.000	-0.030	-0.381	-0.008	0.039	0.200	-0.138	-0.053
Area	3			1.000	-0.036	0.128	0.475	0.023	-0.121	0.205
Population Density	4				1.000	-0.088	0.044	0.006	-0.142	-0.133
Job Ratio	5					1.000	0.185	0.163	-0.217	0.375
Retail Sales	6						1.000	0.141	-0.190	0.181
Rateable Value	7							1.000	-0.612	0.056
Ratio Revenues to Income on Rate Fund Account	8								1.000	0.132
Per Capita Total Expenditures	9									1.000

a restriction was contained in the program which required that the values be greater than 0. Inasmuch as many of the County Boroughs experienced a net loss in population during the 1951-1961 decade, it was necessary to exclude Population Change from the list of variables to be transgenerated.

The results of transgenerating the data are shown in Table XVI. As was found by the first step in the analysis, Job Ratio is the single most important variable. It is followed in terms of decreasing importance by the log of Rateable Value, the Ratio of Revenues on the Rate Fund Accounts to Income as a Function of Rates, Rateable Value, and Area. Population was third least important, slightly exceeding the log of Retail Sales.

The Coefficient of Correlation which resulted from transgenerating the original independent variables and including these new variables with the original ones into the regression equation shows a marked improvement. An R of +0.6983 resulted with an R^2 of 0.4876. Nearly 50 percent of the expenditure variability in terms of Total Expenditures appearing on the Rate Fund Accounts of the County Boroughs is explainable in terms of Job Ratio, the log of Rateable Value, the Ratio of Revenues on the Rate Fund Accounts to Income as a Function of Rates, Rateable Value and Area.

C. Summary of Results

Services. Where the expenditure trends were examined across the various types of local authorities, the curve characteristics suggests that as population increases there is a corresponding decrease in per capita costs for two of the functional categories, namely, Public Health and House

TABLE XVI

CORRELATION MATRIX FOR THE COUNTY BOROUGHS
OF ENGLAND AND WALES
(Nine Original Variables, Seven Transgenerated Variables)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Population	1	1.000	-0.125	0.881	0.335	0.155	0.584	0.059	-0.198	0.168	0.893	0.756	0.343	0.158	0.408	0.111	-0.199
Population Change	2		1.000	-0.030	-0.381	-0.008	0.039	0.200	-0.138	-0.053	-0.142	0.044	-0.295	0.025	0.121	0.237	-0.125
Area	3			1.000	-0.036	0.128	0.475	0.023	-0.121	0.205	0.808	0.921	-0.035	0.151	0.326	0.058	-0.123
Population Density	4				1.000	-0.088	0.044	0.006	-0.142	-0.133	0.423	-0.186	0.956	-0.134	-0.112	0.023	-0.139
Job Ratio	5					1.000	0.185	0.163	-0.217	0.375	0.116	0.160	-0.045	0.980	0.390	0.228	-0.212
Retail Sales	6						1.000	0.141	-0.190	0.181	0.306	0.297	0.061	0.179	0.873	0.183	-0.198
Rateable Value	7							1.000	-0.612	0.056	0.097	0.078	0.043	0.151	0.338	0.960	-0.633
Ratio Revenues to Income on Rate Fund Account	8								1.000	0.132	-0.243	-0.139	-0.190	-0.165	-0.346	-0.748	0.995
Per Capita Total Expenditures	9									1.000	0.065	0.194	-0.178	0.366	0.267	0.099	0.127
Log of Population	10										1.000	0.793	0.461	0.116	0.177	0.149	-0.242
Log of Area	11											1.000	-0.174	0.188	0.231	0.114	-0.146
Log of Population Density	12												1.000	-0.087	-0.050	0.075	-0.179
Log of Job Ratio	13													1.000	0.372	0.205	-0.157
Log of Retail Sales	14														1.000	0.413	-0.361
Log of Rateable Value	15															1.000	-0.762
Log of Ratio Revenue to Income on Rate Fund Account	16																1.000

and Trade Refuse. In contrast, both Police and Sewerage and Sewage Disposal appear to increase in costs with increasing population. Parks, Pleasure Grounds, and Open Spaces, Education, along with Highways, Bridges, and Footpaths and Public Lighting have expenditure characteristics which are non-linear in direction, essentially U-shaped. All other services have variable trends with few meaningful characteristics.

Five of the ten functional categories provided by those authorities with the highest levels of self-determination appear to increase in cost as population increases. House and Trade Refuse; Protection of Children; Highways, Bridges, and Footpaths; Education and Police follow this trend. Sewerage and Sewage Disposal is the only functional category where there is a suggestion that as population increases there is a per capita decrease in the cost of the service. Only three functions, Public Health; Parks, Pleasure Grounds and Open Spaces and Public Lighting, are suggestive of a U-shaped curve.

Where linear relationships are suggested by the curves, one finds that statistical confirmation is lacking. An association between population size and per capita expenditures is confirmed only for House and Trade Refuse and Trade Refuse on the County Boroughs, the Protection of Children, and Police. With these three services the relationship is decidedly unimportant as it is from low to moderate in character.

One can only conclude from this that the expenditure differences among the local authorities is attributable to factors other than just population size. These factors are neither few in number nor readily identifiable. Through a better understanding of the functional characteristics of each of the services, especially such factors as the level of service provision made and the performance standards reached, other more salient independent variables could be identified.

Total Expenditures. The most significant inference which emerges from the analysis of data on the County Boroughs is the unimportance of population in explaining differences in expenditure levels. Despite the suggestive nature of the expenditure curve for the County Boroughs, population proved to be the single least important independent variable in the first part of the multiple regression analysis, and only improved slightly where a transgeneration of the original variable was performed. The variables of Job Ratio, the Ratio of Revenues on the Rate Fund Accounts to Income as a Function of Rates, the log of Rateable Value, Rateable Value and Area yielded the greatest explanatory power. That population size proved unimportant is not without substantiation in terms of findings from other studies, and its general relationship with the other variables used in the multiple regression analysis is also consistent with findings in other works.[106]

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[106] Stanley Scott and Edward L. Feder, Factors Associated with Variations in Municipal Expenditure Levels (Berkeley: University of California, 1957), p. 31; Harvey E. Brazer, City Expenditures in the United States, National Bureau of Economic Research, Occasional Paper No. 66 (New York, 1959), p. 66; Bryan H. Massam, "A Test of a Model of Administrative Areas," Geographical Analysis, Volume 3, No. 4 (October, 1971), p. 405; Hirsch, op. cit., p. 241; James B. Kracht, "The Measurement of Factors Associated with Municipal Expenditures and their Relation to the Problem of Optimum City Size," Unpublished Master's thesis, Indiana State University, Terre Haute, Indiana, 1969, p. 61.

The importance of Job Ratio in explaining the levels of per capita expenditures among the County Boroughs is somewhat surprising. It was included in the regression equation under the "city exploitation" rubric. There is the inference that the non-resident population of the County Boroughs, i.e., the commuting labor force and shoppers, consume the municipal public services when they are in the city. They add to the citys' per capita cost of public goods, but they escape the burden of paying for the services consumed. Clearly the "exploitation" thesis is supported in terms of the analysis. The association suggests that with increasing per capita costs there is a corresponding increase in the commutation ratio. It would be useful in clarifying the relationship between per capita total expenditures and Job Ratio to know the degree to which commutation raises the per capita gross income at the same time that it affects per capita total expenditures. The differences between the two effects of commutation would be a better measure of exploitation than either of the separate effects.

The Ratio of Revenues on the Rate Fund Accounts to Income as a Function of Rates was positively associated with per capita total expenditures. The clearest implication of this relationship is that as the ratio increases in magnitude the gap widens between income derived from rates and income derived from all sources on the Rate Fund Accounts. To maintain the same level of per capita expenditures from one time period to another either rates must be increased or a greater dependency must be placed upon revenue sources other than rates, in particular the grants from the central government. What this ratio states is that the "richer" authorities are better off than the "poorer" ones. None of them, however, escape the dependency on central government grants. Boyle has observed that the dependency is in the order of more than fifty percent of a local authorities' income. An increasing proportion of the grants takes the form of block grants distributed on some basis which relates to the different tax bases and needs of the local authorities.[107]

Given the findings on the Ratio of Revenues on the Rate Fund Account of Income as a Function of Rates, it is not surprising that Rateable Value is associated with per capita total expenditures for the County Boroughs. Both Rateable Value and its transgeneration proved of explanatory importance. Rateable Value is a measure of "fiscal capacity". Its relationship to per capita total expenditures was fairly predictable, although the dependency of the British local authorities on central government grants could have possibly obscured any association between the two.

Area was the only other independent variable included in the multiple regression analysis that proved important. The relationship is not a strong one. It does suggest that it is a factor worth assessing further in terms of its possible influence on per capita expenditures. Why area proved important and the effects of density were negligible is unclear.

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[107]Boyle, loc. cit.

PART III

OVERVIEW, CONCLUSIONS, AND SUGGESTIONS FOR FURTHER RESEARCH

"...there is no facile means of explaining the tremendous range of differences in the levels of city expenditures."[108]

CHAPTER VI

OVERVIEW, CONCLUSIONS, AND SUGGESTIONS FOR ADDITIONAL RESEARCH

Before presenting conclusions arising as a result of this investigation, it will be useful to review the theoretical origins of the thesis problem and the assumptions upon which the study is based.

A. Overview

The central question of the study is whether there is a relationship between municipal efficiency and city-size. Properly speaking, the question belongs in the realm of ideals, for it is really an outgrowth of utopian thinking about communities. Its fundamental premise is that the city is similar to a natural organism which supposedly possesses a teleological, goal-seeking, self-actualizing nature best realized within limits. The theory of the firm provides the basic assumptions upon which the demonstration of the existence or non-existence of a best size for the city rests.

Scale has been recognized for sometime as influencing the unit costs in the production of goods. When volume is

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[108]Brazer, op. cit., p. 68.

small unit costs are high. As the scale of production expands costs decline until the point is reached where marginal cost equals marginal revenue. At this point equilibrium is achieved and beyond the law of diminishing returns takes effect and diseconomies of scale result.

Proponents of the municipal efficiency city-size question argue that the firm and the city are sufficiently similar in organization, function, and operational characteristics that the theory of the firm should find confirmation in the city. For both the firm and the city a U-shaped expenditure function is presumed. For the city, as in the case of the firm, at the point where marginal cost equals marginal revenue the best size for efficiency is purportedly found.

The procedure used in this study to test the efficacy of the city-size question is one of using population size (independent variable) to explain variations in per capita expenditures (dependent variable) among the selected local authorities. How the independent variable gets translated into the dependent variable is not a concern of the study. As a condition of the method of analysis one must view the local authorities as passive entities through which the input wealth is converted to outputs like Police, Education, and the other municipal services. Furthermore, it is also required that the assumption be made that (a) per capita wealth is converted into demands for governmental services, (b) these demands are processed through the governmental system, and (c) the resulting expenditure data reflect satisfaction in terms of demands.

The assumptions upon which the investigation rests are indeed sweeping and far reaching in their implications and importance. However, their rejection requires an approach that usually falls under the general rubric of rational choice theories.

From the rational choice perspective municipal actions are ultimately the result of individual behaviour. Explanation proceeds by analysis of the goals of individuals and the incentives that the environment provides for them to adopt one move rather than another in pursuit of their objectives. This approach is most suited to a case study foremat, and its adoption in terms of the present study would require an examination of each and every authority, their goals formulations, the procedures used in processing the goals, and resulting actions. Over the data record set for this study such an undertaking would have proven virtually impossible for a single individual. Furthermore, even if the approach could be utilized in terms of the study it is doubtful that it would yield the desired information given the objectives of the investigation. The rational choice approach permits useful explanations of process and procedure; however, one cannot learn much about the total pattern which emerges as a result of collective actions. This latter concern dictated the approach taken in the study.

B. Conclusions

The existence of a U-shaped expenditure function among the local authorities either in terms of Service categories or of Total Expenditures is not substantiated in this study. This lack of substantiation is as much a function of unknown and therefore unmeasured factors as it is the deficiencies arising as a result of the analysis of data.

In the analysis of data by service categories, where the expenditure trends were examined across the various authorities, four of the functions show some indications of a U-shaped cost curve. These four are Education; Parks; Pleasure Grounds, and Open Spaces; Highways, Bridges, and Footpaths; and Public Lighting. Two of these functions, Parks, Pleasure Grounds, and Open Spaces along with Public Lighting, retained the U-shape when the analysis shifted to those authorities having the highest levels of self-determination. In this step of the analysis Public Health also has an indication of a U-shape curve. While these curves are very suggestive, the significance that one can attach to them is questionable given the results of the simple correlation tests.

Various of the cost curves on services give indications of some measure of linearity notably Public Health; House and Trade Refuse; Police and Sewerage and Sewage Disposal in the first step of the analysis. House and Trade Refuse; Protection of Children; Highways, Bridges, and Footpaths; Education, and Police indicated some linearity in the second part. However, the results of simple correlation indicate an association of low to moderate character for only House and Trade Refuse on the County Boroughs, the Protection of Children, and Police, with the latter function showing the strongest relationship. This finding suggests that population size is not an important explanatory variable in and of itself in explaining the differences in expenditure levels among the local authorities. In addition it suggests that where U-shaped cost curves are found they may have very little explanatory significance. Certainly positive conclusions are not warranted and should be held in abeyance until other independent variables are tested as determinants of the differences among the authorities in levels of expenditures.

A well-defined U-shape curve is found for Total Expenditures on the County Boroughs. Yet, as in the case of the individual functional categories, its meaning is unclear given the results of the multiple regression analysis. The major inference to be drawn from the regression analysis is that there is little, if any, demonstrable positive relationship between the population size of the County Boroughs and their levels of expenditure per capita when other independent variables are taken into account. While population size is not revealed as an important variable, fiscal capacity or availability of resources, however measured, emerges as a major factor. Also, there is a strong positive relationship in terms of the "city exploitation thesis"; however, this is a factor that requires further investigation to determine its importance. This also applies in terms of area as an independent variable.

These findings appear to have significance for municipal administrators and ministry administrators and planners, if not in the solution of day-to-day problems, then in the development of objectives and general policy. If a determination can be made that the city exploitation thesis still holds after an assessment is made of the two effects of commutation, i.e., that commutation raises per capita gross income as well as increasing per capita costs, then the size of the population not included in the County Borough limits represents a cost factor to the residents of the municipalities. The latter are, in part, carrying the burden of the central city, which is used daily by a non-resident population. Thus, from the standpoint of fiscal policy alone a case can be made for the establishment of larger more encompassing governmental units.

One additional implication comes from the findings of this study. The implication is that fiscal capacity is more of an important factor to be considered where boundary changes among local authorities are contemplated than population size. Of course, the importance of this factor diminishes as the dependency on central authority grants increases.

Deficiencies of Study. The major deficiency of the study is the attempt to bring "hard" data to bear on a problem that essentially lies in the realm of ideals. Yet, in spite of this, the results of the study could be made much more meaningful if certain data could be brought to bear on the problem. This especially applies where the analysis of data on the services is concerned. A clearer indication of expenditure functions could be derived if standards of need as well as standards of performance for the individual services were available. However, these are virtually absent in terms of the local authorities, at least in a form that allows for statistical treatment, and as the West Midland Group Study points out "...In explaining differences between authorities of costs in services, one obviously looks for differences in the standard reached, or the amount of provision made; and in explaining these one must take into account differences in demand or need."[109] Further work on the municipal efficiency city-size problem is virtually blocked until considerable conceptual work is done toward developing indexes of scope and quality of services that can be used as independent variables.

C. Suggestions for Further Research

A geographer's concern for broadening the search for correlates of urban size was the initial impetus for this study. It was recognized at the outset that the problem lies on the periphery of what is usually considered the centre of geographic enquiry. In making suggestions for additional research one must admit in all candor that where avenues for further work are open and hold promise of fruitful results, they lead even further away from the traditional research concerns of geographers. For this reason, the suggestions which are presented in the following paragraphs may have more interest for students of public administration, economics, municipal finance or urban planning.

In terms of the directions set in the present study, there are two topics that are in need of investigation. Each promises to contribute greatly to a better understanding of the municipal efficiency city-size issue. The first problem area concerns the nuances with which efficiency manifests itself within the municipal context. The central

[109] A West Midland Group Study, Local Government and Central Control (London: Routledge and Kegan Paul, Ltd., 1956), p. 116.

question is whether efficiency is a quality measurable in a rigorous manner, or is it largely a pragmatic virtue. The second problem area concerns a better understanding of the quality dimensions of municipal services and an assessment of the possible influence that they may have in terms of the municipal efficiency city-size question. Each of these topics is developed at some length below to illustrate their relationship and general importance to the thesis problem. Bibliographic sources accompany the discussion.

Meaning of Efficiency. Efficiency as a concept implies a means-to-end relationship. In a municipality this means-to-end relationship is one largely of the allocation of resources to attain certain objectives. It can be increased by either increasing the degree of attainment or by reducing the amount of resources used for a given level of attainment. This latter characteristic, i.e., making do with fewer resources is more commonly known as "economy".[110]

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[110] This discussion of efficiency within a municipal framework is drawn largely from the following sources: A. E. Buch, "Measuring the Results of Government," National Municipal Review, Vol. 13, March, 1924, pp. 152-157; Jesse D. Burks, "Efficiency Standards in Municipal Management," National Municipal Review, Vol. 1, March, 1912, pp. 364-371; G. N. M. Currie, "Efficiency vs. Service in Public Administration," Canadian Public Administration, Vol. 7, No. 2, June, 1964, pp. 165-174; Louis P. Head, "Measuring the Efficiency of Cities' Government." Reprinted from the Dallas News, March, 1927; John M. Leavens, "Measuring for Budget Performance-Concepts," Municipal Finance, Vol. 33, No. 1, August, 1960, pp. 64-67; Clarence E. Ridley and Herbert A. Simon, Measuring Municipal Activities: A Survey of Suggested Criteria and Reporting Forms for Appraising Administration. The International City Managers' Association, 1938; Richard S. Takasaki, "Measuring Efficiency in Government," Municipal Finance, Vol. 34, May, 1962, pp. 145-152; Sir Frank Tribe, "Efficiency in the Public Services, "Public Administration, Vol. 27, Autumn, 1949, pp. 159-167; Mabel L. Walker, Municipal Expenditure (Baltimore: The Johns Hopkins Press, 1930); Sherman Wyman, et. al., City Manager-City Council Role Concensus and Its Effect on Municipal Performance. University of Southern California Defense Training Program Report No. 6, Los Angeles, California, 1967; Sherman Wyman, Municipal Performance Evaluation: A Report Based on Two Municipal Performance Evaluation Workshops. University of Southern California Defense Training Program Report No. 10, Los Angeles, California, 1968.

As used by public administrators, the concept of efficiency assumes two characteristics (1) technical efficiency and (2) valued efficiency.[111] Taking the technical formulation first, it is defined as the ratio of physical input to physical output. The higher the ratio, the greater is the efficiency of the operation. This relationship may be expressed in various ways.

(1) Output measured by physical units, input by man-hours.

$$\frac{\text{Units of output}}{\text{Man-hours}} = \text{Number of units produced per man-hour of input}$$

(2) Output measured by physical units, input by money terms.

$$\frac{\text{Units of output}}{\text{Cost of input}} = \text{Number of units produced per monetary unit of input}$$

(3) Both output and input measured in terms of monetary units.

$$\frac{\text{Monetary value of product}}{\text{Cost of input}} = \text{Monetary value of produce per monetary unit of output.}$$

The appeal of the technical efficiency formulation is its presumed objectivity. There is the inference that efficiency can be quantitatively measured. However, where attempts have been made to employ the technical efficiency concept in measuring the performance of municipal governments it has for the most part found little application. It has found more usage in industry where the production of goals is of primary importance. As a general rule, municipalities do not produce goods; rather, they provide services, and it is

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[111] Takasaki, _op_. _cit_., p. 145.

difficult to measure inputs and outputs for services.

The difficulties found in terms of the technical conceptualization of municipal efficiency has necessitated a less technical view of the concept, one where emphasis is put upon a pragmatic usage of the term within a goals-value framework.

The essence of the valued efficiency concept is the idea of a community will where goals or objectives are derived as a result of individual and collective concerns. These are articulated into policy statements and given priority ratings. Measurement becomes a task of relating valued inputs to valued outputs. Measurement is necessarily subjective rather than objective, and comparing one municipality to another is impossible unless a proper interpretation is made of the value framework. By way of illustration, one authority may put law enforcement at the top of its priority listing and the citizens may be willing to spend a great deal more on this functional category than other municipalities. In contrast, another municipality may put more importance on clean streets, thus a different orientation in terms of its value system. Either municipality may change its goals orientation within a given period with a resultant shift in the levels of expenditures. If this concept of municipal efficiency is to prove useful it becomes necessary to determine not only the means-to-end relationships, but also when shifts in objectives occur and how these shifts are reflected by expenditure data.

Both the technical formulation of efficiency and the valued viewpoint offer advantages in terms of further work on the municipal efficiency city-size problem. The technical formulation offers the possibility of permitting a rigorous measurement of the ratio of resources allocated to attainment outputs. Whereas, the values measure offers the potential advantage of accounting for shifts in goals formulated by local authorities. What is required is an investigation, preferably within the local authority context rather than in the abstract, of the degree to which these two formulations of efficiency may be made one. A composite index of efficiency is required.

Quality Dimensions of Municipal Services. In explaining differences between authorities of costs in services one is ultimately required to examine differences in the standards reached or the amount of provision made. This becomes a matter of the levels of effectiveness, and this in turn relates to the quality of the services.

Quality in the sense it is used here is really a step-child of the economist, and while it has been rather recent that any interest has been shown in it as a economic parameter, it was at least recognized early as having theoretical importance in explaining differences in economic commodities. For example, Adam Smith realized that "...the time spent in different sorts of work will not always alone determine the proportion between two quantities of work. The different degrees of hardship endured and the ingenuity exercised must likewise be taken into account."[112] Smith observed that

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[112] Adam Smith, The Wealth of Nations, Modern Library Edition (New York: Random House, 1937), p. 31.

"...it is not easy to find an accurate measure, either of hardship or ingenuity."[113]

Alfred Marshall, like Smith, recognized that there are quality differences among economic commodities. However, he chose to disregard them assuming "...for the sake of simplicity, that all the corn in the market is the same quality."[114] Since the work of Smith and Marshall, there have been numerous attempts to account for quality differences among economic commodities.[115]

Like a tangible good, a municipal service can have a variety of quality dimensions. One illustration of this is water. Water, as a substance, has temperature, colour, taste, odour, mineral content, bacteria count, hardness, and turbidity. When water is delivered, its delivery system also assumes certain quality characteristics, among which are pressure, reliability of supply, and correct metering where

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[113]Ibid.

[114]Alfred Marshall, Principles of Economics (London: Macmillan and Co., Ltd., 1890), p. 332.

[115]Lawrence Abbott, "Vertical Equilibrium under Pure Quality Competition," The American Economic Review, Vol. 3, December, 1953, p. 827; H. D. Houthaker, "Compensated Changes in Quantities and Qualities Consumed," Review of Economic Studies, Vol. 19, 1952-53, pp. 155-164; Erland von Hofston, Price Indices and Quality Changes (London: Allen and Unwin, 1952); Frank de Leeuw, "The Measurement of Quality Changes," Proceedings of the Business and Economic Statistics Section, American Statistical Association, 1958, pp. 174-183; Irma Edelman and Zvi Grillches, "on an Index of Quality Change," Journal of the American Statistical Association, Vol. 295, September, 1961, pp. 535-548.

this characteristic is applicable.

Each of the functions appearing on the Rate Fund Accounts requires a quality determination similar to water. This would necessitate the articulation of standards of both need and performance. From the application of these standards, indexes of scope and quality could be derived which in turn could serve as independent variables within a regression equation and potentially raise the level of explanation as to the differences in expenditure levels among the local authorities.

One final observation needs to be made regarding further research on the municipal efficiency city-size problem. In the opinion of this author the ultimate resolution of the question lies within the framework of governmental performance measurement. The kind of performance accounting suggested is not simply an expression of satisfaction or dissatisfaction by way of the ballot box. Rather a system is required where a close monitoring of process and procedure is possible with considerations of scope and quality of functional activities included as well as supply and demand factors. While there is a growing awareness and interest in governmental performance measurement, the conceptual and statistical problems are formidable in the extreme. One might further add that the cultural and institutional constraints that would work against the implementation of such a monitoring system would also be formidable in the extreme, especially in the context of an institutional setting such as Great Britain where decision-making and responsibility are both quite diffuse.

No matter which direction governmental performance measurement takes in the future, researchers working in this area must become more cognizant of the relationship of cities to their national settings. While no documentation can be offered, in reading much of the literature on the optimum city-size question, both in terms of the municipal efficiency idea as well as in the larger context, one gets the impression that many of the remarks made about the subject have been made with little regard for the institutional settings of modern cities. Cities are viewed as city-states, with little real thought, that their affairs and fortunes are circumscribed within nation-states.

Britain serves as an excellent example, not only in terms of the institutional relationships of local governments to central authorities, but also in terms of the conceptual difficulties entailed in measuring governmental performance.

Local authority activities in Britain are very much shared responsibilities. Many functions that were formerly carried out by local governments are now under central control. Such is the case with trunk roads, hospitals, public assistance and valuation of property for rating. Many _ad hoc_ bodies have assumed responsibility for such formerly locally determined functions as licensing of passenger road services, gas and electricity supply, and other public utility services, all, of course, subject to varying degrees of central control. Then, of course, there are the various grant provisions from the central government which increases the dependency on central authority in an ever increasing manner. One can argue validly that for many functions the local authorities are little more than administrative extensions of central control.

Under such institutional conditions municipal performance measurement is made doubly difficult in view of the fact that local responsibility and central control are so interlocked. Literally, performance indexes formulated for local usage would necessarily have to apply to many central authority functions, especially in terms of efficiency and its various points of manifestation. All of which points up again the conceptual difficulties one encounters in attempting to take a proposition which has its origins in the realm of ideals and put it within the context of the real world and assess its relevancy as a viable planning principle.

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APPENDIXES

APPENDIX A

SOURCES OF DATA

1. Rate Fund Expenditures. Expenditures appearing on local authority Rate Fund Accounts were derived from the Epitomes of Accounts for those authorities in England and Wales. For Scottish authorities the data were obtained from the Abstracts of Accounts.
2. Population. Population data for the respective authorities were compiled from the Register General's annual estimates and from the enumerated 1961 census.
3. Per Capita Expenditures. Total expenditures appearing on the Rate Fund Accounts and costs relating to each specific function were divided by population which yielded the per capita expenditure data.
4. Population Change, 1951-1961. Population change as a variable was calculated by determining the net percentage increase or decrease for each authority over the 1951-1961 decade.
5. Area. Area data on each authority were compiled either from the Register General's annual estimates of population or from the Institute of Municipal Treasurers and Accountants' reports, especially the Return of Rates and Rates Levied Per Head of Population (England and Wales) and the Rating Review reports (Scottish Branch).
6. Population Density. The population for each authority for a particular year was divided by the area.

7. Ratio of Revenue on Rate Fund Accounts to Revenues Derived as a Function of Rates Levying. The level of revenues available on Rate Fund Accounts from all sources were compared to the level of revenues specifically occurring as a function of the levying of rates. Source: The Epitomes of Accounts for England and Wales and the Abstracts of Accounts for Scotland.
8. Retail Sales Volumes. Data on retail sales volumes were obtained from the Board of Trade reports entitled, Report on the Census of Distribution and Other Services, 1961, Part II, Summary Figures for Area (London: H. M. S. O., 1964) and Table 3-Retail Trade Totals for Towns and Other Areas (London: H. M. S. O., 1961).
9. Rateable Value. Data on Rateable Value for each authority were derived from reports issued by the Institute of Municipal Treasurers and Accountants, specifically the Return of Rates and Rates Levied Per Head of Population covering local authorities in England and Wales and the Rating Review issued by the Scottish Branch of the Institute.
10. Rateable Value Per Capita. The per capita expression of Rateable Value was derived by dividing total rateable value by population.
11. Job Ratio. Data on the Job Ratio variable were compiled from the following sources: Scotland. Census 1961, Volume Six, Occupation, Industry, and Workplace, Part III, Workplace Tables (Edinburgh: H. M. S. O., 1966); England and Wales. Census 1961, Workplace Tables (London: H. M. S. O., 1964).

APPENDIX B

EXPLANATION OF DATA ORGANIZATION AND LISTING OF AUTHORITIES

The compilation of the data follows an alphabet within an alphabet. Originally the data were compiled by authority and by county. However, when the data were prepared for machine processing, the county locations were suppressed in the interest of ease of handling and economy. Thus, the alphabet within an alphabet organization. Listed below is a key to the organizational scheme of the data giving country, county and local authorities.

ENGLAND AND WALES

County	Local Authority
Berkshire	Reading
Cheshire	Birkenhead
	Chester
	Stockport
	Wallasey
Cumberland	Carlisle
Derbyshire	Derby
Devon	Exeter
	Plymouth
Durham	Darlington
	Gateshead
	South Shields

County	Local Authority
Durham (cont.)	Sunderland
	West Hartlepool
Essex	East Ham
	Southend-on-Sea
	West Ham
Gloucestershire	Bristol
	Gloucester
Hampshire	Bournemouth
	Portsmouth
	Southampton
Kent	Canterbury
Lancashire	Barrow-in-Furness
	Blackburn
	Blackpool
	Bolton
	Bootle
	Burnley
	Bury
	Liverpool
	Manchester
	Oldham
	Preston
	Rochdale
	St. Helens
	Salford
	Southport
	Warrington
	Wigan

County	Local Authority
Leicestershire	Leicester
Lincolnshire (Parts of Lindsey)	Grimsby
	Lincoln
Norfolk	Great Yarmouth
	Norwich
Northamptonshire	Northampton
Northumberland	Newcastle-upon-Tyne
	Tynemouth
Nottinghamshire	Nottingham
Oxfordshire	Oxford
Somerset	Bath
Staffordshire	Burton upon Trent
	Smethwick
	Stoke-on-Trent
	Walsall
	West Bromwich
	Wolverhampton
Suffolk East	Ipswich
Surrey	Croydon
Sussex East	Brighton
	Eastbourne
	Hastings
Warwickshire	Birmingham
	Coventry
Worcestershire	Dudley
	Worcester
Yorkshire (East Riding)	Kingston upon Hull
Yorkshire (North Riding)	Middlesbrough

County	Local Authority
Yorkshire (West Riding)	Barnsley
	Bradford
	Dewsbury
	Doncaster
	Halifax
	Huddersfield
	Leeds
	Rotherham
	Sheffield
	Wakefield
	York
Glamorganshire	Cardiff
	Merthyr Tydfyl
	Swansea
Monmouthshire	Newport
London: Metropolitan Boroughs	Battersea
	Bermondsey
	Bethnal Green
	Camberwell
	Chelsea
	Deptford
	Finsbury
	Fulham
	Greenwich
	Hackney
	Hammersmith
	Hampstead
	Holborn

County	Local Authority
London: Metropolitan Boroughs (cont.)	Islington
	Kensington
	Lambeth
	Lewisham
	Paddington
	Poplar
	St. Marylebone
	St. Pancras
	Shoreditch
	Southwark
	Stepney
	Stoke Newington
	Wandsworth
	Westminister, City of
	Woolwich
SCOTLAND	
Aberdeen	Aberdeen
	Fraserburgh
	Peterhead
Angus	Arbroath
	Dundee
	Forfar
	Montrose
Argyll	Dunoon
Ayr	Ayr
	Irvine
	Kilmarnock
	Prestwick

County	Local Authority
Ayr (cont.)	Saltcoats
	Troon
Banff	Buckie
Bute	Rothesay
Clackmannan	Alloa
Dumfries	Dumfries
Dumbarton	Bearsden
	Clydebank
	Dumbarton
	Helensburgh
	Kirkintilloch
Fife	Buckhaven
	Cowdenbeath
	Dunfermline
	Kirkcaldy
	Lochgelly
	St. Andrews
Inverness	Inverness
Lanark	Glasgow
	Airdrie
	Coatbridge
	Hamilton
	Motherwell and Wishaw
	Rutherglen
Midlothian	Edinburgh
	Musselburgh
Moray	Elgin
Perth	Perth

County	Local Authority
Renfrew	Barrhead
	Gourock
	Greenock
	Johnstone
	Paisley
	Port Glasgow
	Renfrew
Roxburgh	Hawick
Selkirk	Galashiels
Stirling	Falkirk
	Grangemouth
	Kilsyth
	Stirling
West Lothian	Bathgate
	Borrowstouness

APPENDIX C

COMPILATION OF DATA

<u>Note</u>: Expenditures by Functional Categories and by Totals are Listed in £'s.

TOTAL EXPENDITURES FOR YEAR 1957

ENGLAND AND WALES 1957

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
READING	1507621	285110	75597	68699	78683	58416	183323	40356	41129	215222	3108601	118100
BIRKENHEAD	1607860	365871	53705	145329	83449	42489	169935	62992	86797	399694	3358787	142100
CHESTER	672827	185901	47221	47111	39757	31450	92381	20158	38915	53621	1423945	59100
STOCKPORT	1605549	371250	87554	127347	107441	57879	140598	56406	68034	252100	3090298	141200
WALLASEY	1124227	266862	22413	77485	65458	31886	80239	45843	55297	193648	2520951	102800
CARLISLE	801757	166917	37525	51163	37187	39494	70403	29317	43625	114900	1614391	69200
DERBY	1701501	501193	183505	109710	117918	54996	176202	41339	74732	253886	3561159	135500
EXETER	858950	271212	49115	50789	38109	30687	111230	28593	48950	143892	2091597	76900
PLYMOUTH	2185823	482120	92994	166529	134246	116935	507225	77085	99246	384173	5180810	217900
DARLINGTON	922296	199023	46186	69659	34325	27953	82330	36505	34318	66211	1750124	83260
GATESHEAD	1246507	237721	21509	105209	53515	82372	165597	45207	46152	165724	2709964	110900
SOUTH SHIELDS	1149054	270364	27758	82375	103711	55108	148163	42025	65874	181466	2425715	108300
SUNDERLAND	2304574	370952	58594	159876	79932	104891	258700	57926	79279	238253	4329107	183800
WEST HARTLEPOOL	793795	116827	9321	41483	38680	52925	64919	26261	36214	63686	1538598	73940
EAST HAM	1518407	296349	56817	94159	55360	96491	118894	24301	63201	0	3051387	112700
SOUTHEND-ON-SEA	1745320	564527	155987	188082	120020	53188	457764	35485	66327	362597	4581206	156800
WEST HAM	2055782	448725	114599	107156	56236	90923	284730	40580	144438	0	4774297	165900
BRISTOL	5204135	1014245	216387	347986	189925	166365	653274	150608	257137	947094	11410285	439600
GLOUCESTER	1026153	174985	59760	41569	24270	22808	105566	23583	50835	57019	1865136	68100
BOURNEMOUTH	1351275	507282	76397	132807	195367	56195	222834	72368	81786	252702	3478046	143500
PORTSMOUTH	2505219	526601	171683	159528	105784	76059	291097	51864	109673	472400	5331543	226900
SOUTHAMPTON	2316546	487553	108410	146013	135858	73609	295674	54784	114306	419263	4921916	197000
CANTERBURY	507040	59339	15059	15881	18126	10674	49838	8685	18040	32502	904814	30200
BARROW-IN-FURNESS	782389	178960	27438	59084	30528	31271	104564	25928	37646	144952	1681370	64700
BLACKBURN	1213447	256048	38300	123270	46431	40733	171428	38686	45820	197762	2714070	107000
BLACKPOOL	1453695	555313	102309	181705	121598	33595	290742	89828	80050	238810	3573512	145600
BOLTON	2032610	469547	106126	127081	103410	84180	268720	88207	88153	301223	4159711	162900
BOOTLE	883386	182821	45815	44636	44291	29895	50159	29291	78213	147370	1869337	80630
BURNLEY	1095985	268977	71937	66771	71637	25918	131304	55037	52575	192967	2591453	81760
BURY	557128	184265	46672	61818	32716	17992	69323	30552	47910	52915	1439569	58210
LIVERPOOL	9289734	2168015	306318	675061	539941	504129	942285	518029	494296	2472911	20874660	768700
MANCHESTER	9369635	2230387	441976	710161	492672	420331	1248145	403946	354467	1689958	20045817	682000
OLDHAM	1452848	333289	64282	98822	68691	65978	190901	71734	80313	238737	3009835	118800
PRESTON	1395633	342035	76516	111339	65983	36297	100913	38769	57492	230207	2989160	116200
ROCHDALE	997049	287716	75479	84102	59274	37213	169107	69327	57198	181942	2332376	85310
ST. HELENS	1302983	315245	84680	90511	92078	30432	137305	48921	60262	194427	2597470	110900
SALFORD	1880532	554587	111139	145646	124165	94532	205934	70455	99666	390739	4335040	165300
SOUTHPORT	748854	326977	65850	74540	113802	16898	149087	53968	40242	187721	1978739	81900
WARRINGTON	930010	279749	91712	92979	37995	55986	99378	33570	53149	151055	2147136	79420
WIGAN	950724	250542	71673	69478	63529	40447	91235	30548	48297	172723	2170115	81670
LEICESTER	4074259	872232	252854	211309	262904	230417	369229	92317	112577	425250	8018694	281200
GRIMSBY	1345508	238587	81283	83918	31478	51621	103779	31000	39085	214251	2321365	96050
LINCOLN	794741	162679	46860	65078	36762	42778	90575	26032	40105	141828	1888881	71750
GREAT YARMOUTH	680492	189261	26239	29967	69514	18777	69209	23614	37052	119415	1655641	51500
NORWICH	1543140	372975	137959	81390	85404	54108	204535	36686	57074	234934	3162809	119200
NORTHAMPTON	1024778	370324	124539	98495	85675	42137	222975	33639	55882	189921	2546670	101000
NEWCASTLE UPON TYNE	3019910	581898	57662	181900	126931	136943	554061	169854	148151	543393	6621878	275100

TOTAL EXPENDITURES FOR YEAR 1957

ENGLAND AND WALES 1957

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
TYNEMOUTH	602260	124334	8253	45098	31819	32799	75435	30014	44697	125287	1303277	68000
NOTTINGHAM	3735347	852759	236928	219533	190245	131442	337612	101811	128265	665779	7767915	312600
OXFORD	1215918	330886	128236	73720	65098	53730	180501	47521	53081	179372	2834565	104400
BATH	1189788	157996	45605	64259	46144	32740	156632	25367	43735	140140	2298670	80100
BURTON UPON TRENT	680769	220817	126587	41228	20597	24017	49317	18473	37688	35950	1376643	49050
SMETHWICK	864458	201460	31732	68908	37145	31489	64395	26463	41444	57605	1650812	73700
STOKE-ON-TRENT	3638988	849482	350038	241379	144091	140251	376566	105209	109709	389194	7337678	271800
WALSALL	1248921	290673	87472	69728	65955	66214	123179	34934	53050	187259	2629274	114800
WEST BROMWICH	1024098	234372	65199	71840	58096	46104	140705	24754	45964	55665	1953507	93050
WOLVERHAMPTON	1999937	433674	146462	137810	74666	55282	227351	53256	60663	254324	3843927	149900
IPSWICH	1115992	257021	57713	64547	43439	44522	168049	29030	49038	170535	2622776	111900
CROYDON	2811365	742512	183793	181342	170586	99793	394675	74730	128729	0	5924400	249500
BRIGHTON	1837593	533487	25437	149922	215473	81626	427508	71663	83632	346632	4387785	159500
EASTBOURNE	718470	205513	25192	63872	73614	20031	91110	28204	36811	146172	1672468	57800
HASTINGS	632386	230488	18503	36669	96254	32568	104413	31665	41412	155745	1724977	64600
BIRMINGHAM	13011217	3379397	628630	1150570	799146	558871	1813372	538056	626162	2428678	29296502	1111700
COVENTRY	4009548	661996	188264	212016	103254	138502	254528	64965	138996	395978	7635268	267300
DUDLEY	740576	154028	28719	46516	45155	32377	103121	31658	47291	119558	1546330	64570
WORCESTER	1015163	147406	44974	37554	34467	36249	115853	18328	35667	134262	1911336	63630
KINGSTON UPON HULL	3439953	897995	300939	296400	113979	166298	400746	110958	197025	668857	7677807	304500
MIDDLESBROUGH	1942881	374567	53027	122707	122089	83732	192357	65579	78493	262279	3817067	151000
BARNSLEY	1176902	197006	32755	74035	35337	29085	227636	25695	46395	150532	2363008	75360
BRADFORD	3199796	1021510	467062	198188	140704	188049	456759	185984	158180	623019	7259342	287000
DEWSBURY	657876	155332	51453	30693	47168	17048	102571	28833	39105	95917	1382964	53190
DONCASTER	1234754	362283	135478	66243	72332	37412	228231	37633	47067	155773	2890912	83680
HALIFAX	1106911	296587	91514	108159	65616	45252	200126	63505	55466	192221	2452795	95430
HUDDERSFIELD	1514667	407565	195527	99083	52567	73664	229420	68935	56514	238993	3245941	127600
LEEDS	5601645	1529238	391540	507212	298661	294876	1221142	295800	209984	1011147	13064599	510100
ROTHERHAM	1209386	215237	57856	68996	40085	62478	129116	40453	53765	142979	2329218	83350
SHEFFIELD	5513567	1583828	296147	590595	367090	186914	817640	246322	177546	885428	13934423	498500
WAKEFIELD	661919	146843	40968	28797	33897	27701	112962	26813	41573	98132	1465082	59590
YORK	1334491	317891	95899	89491	80850	59572	140318	42631	51679	204865	2761623	106200
CARDIFF	3086770	571190	73107	162466	224404	134682	356125	59911	99933	482724	6040717	251300
MERTHYR TYDFIL	849333	133069	24344	40197	40436	19049	101865	16582	29843	119367	1626539	59300
SWANSEA	2056875	463716	152185	117805	121052	66394	259184	63348	96282	276159	4216847	162300
NEWPORT	1326373	247715	26889	57826	57292	53937	149279	19963	71957	213910	2721596	104700

TOTAL EXPENDITURES FOR YEAR 1957

METRO BOROUGHS OF LONDON 1957

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
BATTERSEA	0	287380	10743	118097	9128	0	150942	40658	0	0	1731673	111800
BERMONDSEY	0	234444	12651	71342	35578	0	193070	20925	0	0	1367902	54750
BETHNAL GREEN	0	214557	9882	68179	12647	0	90507	17412	0	0	899329	50940
CAMBERWELL	0	364936	41437	156491	55004	0	284095	47506	0	0	2787735	177700
CHELSEA	0	144033	9266	69741	10284	0	164358	23751	0	0	1713547	50600
DEPTFORD	0	186389	9986	64196	25602	0	111191	20877	0	0	1069453	70970
FINSBURY	0	256640	14134	55373	43617	0	123760	22882	0	0	1907672	34830
FULHAM	0	329682	10344	137667	65497	0	143725	31496	0	0	1903934	116200
GREENWICH	0	209692	8977	81666	20812	0	127491	42496	0	0	1451741	88910
HACKNEY	0	409442	34188	165363	22881	0	283630	41515	0	0	2624960	165000
HAMMERSMITH	0	237172	13554	105176	35104	0	176111	45117	0	0	1958252	111700
HAMPSTEAD	0	229507	30895	104708	4657	0	208163	35706	0	0	1863870	97130
HOLBORN	0	141512	4522	47894	17172	0	103830	34530	0	0	2543645	22230
ISLINGTON	0	542525	12974	284173	52222	0	205688	77243	0	0	2925864	227800
KENSINGTON	0	372286	21445	213810	21344	0	304382	80152	0	0	4002296	167900
LAMBETH	0	368916	28158	213430	27108	0	289310	85323	0	0	3299079	224300
LEWISHAM	0	409148	34944	188247	43070	0	235139	82860	0	0	2986004	220900
PADDINGTON	0	357090	23868	159122	31271	0	189569	73976	0	0	2419760	120500
POPLAR	0	292696	18979	91423	25241	0	188237	33317	0	0	1337716	67080
ST. MARYLEBONE	0	366632	13795	179585	10951	0	361273	40153	0	0	4360374	72530
ST. PANCRAS	0	332460	9382	159942	33504	0	261051	61699	0	0	2951803	132000
SHOREDITCH	0	187612	8678	54275	25272	0	108021	23663	0	0	1147036	43870
SOUTHWARK	0	318223	6960	142693	42717	0	203961	53171	0	0	1780496	91140
STEPNEY	0	393331	47634	149535	37541	0	208840	30613	0	0	2198805	97810
STOKE NEWINGTON	0	125197	7973	46579	1913	0	37113	16183	0	0	782494	50480
WANDSWORTH	0	540286	45140	251216	53212	0	304446	143036	0	0	4431626	337700
WESTMINSTER	0	648890	47302	333212	28295	0	572984	198082	0	0	13761734	95930
WOOLWICH	0	418239	18035	158051	68894	0	195106	69224	0	0	2470315	146200

TOTAL EXPENDITURES FOR YEAR 1957

SCOTLAND 1957

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
ABERDEEN	2711901	0	0	0	0	129776	183836	123491	69935	321111	6337665	186190
ARBROATH	71300	0	0	0	0	2961	39263	12396	7417	13910	307702	19785
DUNDEE	2196777	0	0	0	0	49109	418549	141023	65094	349318	4495054	179225
AYR	175699	0	0	0	0	0	29550	38270	8034	98008	713077	43685
KILMARNOCK	151814	0	0	0	0	24373	73920	29959	9482	93602	958850	44307
DUMFRIES	99482	0	0	0	0	6307	35878	10210	5165	17818	392212	27430
CLYDEBANK	183777	0	0	0	0	13230	70789	38676	13940	40348	966259	49761
DUMBARTON	96290	0	0	0	0	12060	33150	18991	6510	20805	430327	26175
DUNFERMLINE	174531	0	0	0	0	26103	80443	26163	10841	37106	783102	46270
KIRKCALDY	199010	0	0	0	0	23805	42811	38498	12746	37553	848459	51825
INVERNESS	126248	0	0	0	0	6626	59527	24960	16874	56228	513418	28225
GLASGOW	14726264	0	0	0	0	435947	1434196	1270089	588590	2932688	37355423	1079364
AIRDRIE	135462	0	0	0	0	8393	34171	14827	8576	47756	635245	32494
COATBRIDGE	218276	0	0	0	0	11628	67788	21885	13425	91156	985756	51951
HAMILTON	173993	0	0	0	0	19959	62440	32546	11908	71191	745412	41022
MOTHERWELL AND WISHAW	296035	0	0	0	0	10322	97702	52318	0	113461	1224333	71384
RUTHERGLEN	100602	0	0	0	0	3339	28781	17558	6962	16813	439066	24423
EDINBURGH	4738090	0	0	0	0	167422	561576	346949	126372	1200694	10529501	465671
PERTH	154983	0	0	0	0	12484	40915	29923	13014	79087	734247	40919
GREENOCK	247398	0	0	0	0	33331	68997	63130	28198	179639	1359583	77778
PAISLEY	296949	0	0	0	0	24806	108147	52071	34472	179458	1736574	95822
PORT GLASGOW	75101	0	0	0	0	7433	29717	17233	8456	18713	356004	23155
FALKIRK	135648	0	0	0	0	14872	39190	18450	9562	26756	667049	37072
STIRLING	100438	0	0	0	0	13626	27745	12531	6757	20109	430391	26947

TOTAL EXPENDITURES FOR YEAR 1958

ENGLAND AND WALES 1958

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
READING	1793857	295407	83988	64386	80061	58016	183439	41674	45585	232149	3424379	117900
BIRKENHEAD	1811905	391745	60763	150143	93362	45782	195997	67474	113455	414946	3723963	142600
CHESTER	767064	200806	51013	54056	38043	36757	101414	20198	43794	54149	1579176	59300
STOCKPORT	1814169	389179	85031	133596	118439	64237	144283	55721	69455	263694	3648653	141400
WALLASEY	1209365	273915	15149	81831	71513	35989	84512	45878	61254	199860	2699830	102900
CARLISLE	921777	178221	39694	57127	37757	58842	77020	32725	48302	122532	1782963	69400
DERBY	1846919	575690	241670	175524	119093	57540	199166	42762	82281	265917	3811812	133900
EXETER	958541	185149	51723	43973	39483	36859	163352	29443	52077	149289	2270851	76900
PLYMOUTH	2470900	524709	107952	169465	141575	123429	519845	82446	112155	398731	5595402	216300
DARLINGTON	1041220	210246	49593	70927	34265	27046	92579	36863	39452	72567	1923796	83170
GATESHEAD	1328830	235256	20029	100723	62619	77192	182086	48169	49620	168351	2867651	109900
SOUTH SHIELDS	1283004	277672	9467	81916	114000	58230	160186	44405	72700	186676	2652714	108600
SUNDERLAND	2581616	402170	60981	175909	83689	116096	284438	60943	83450	251968	4704269	185100
WEST HARTLEPOOL	901003	133753	11844	42612	48099	56337	74541	29760	37904	65468	1681024	74430
EAST HAM	1648446	310101	59472	97727	57578	77769	119907	23698	70559	0	3245434	110900
SOUTHEND-ON-SEA	1972514	555001	137485	124892	193930	56901	459254	36521	70627	371288	4866521	158100
WEST HAM	2241747	463111	127311	118917	64003	90638	290399	41184	156123	0	4928748	165000
BRISTOL	5860214	1162447	356302	344696	193318	213334	739585	157322	258139	1000572	12688084	438000
GLOUCESTER	1181853	194710	68610	42793	27904	27796	114625	27088	56089	59937	2136520	68400
BOURNEMOUTH	1529369	557954	79868	142341	229186	58055	285801	83448	87372	260151	3745199	143600
PORTSMOUTH	2743143	527432	175564	139237	116007	85012	321613	55305	121957	485546	5509778	222800
SOUTHAMPTON	2789552	525517	130497	146320	141346	81499	288306	62857	123649	427404	5385164	199400
CANTERBURY	581965	63386	14921	18336	17808	9422	55288	9983	18900	33876	1021434	30000
BARROW-IN-FURNESS	876489	179577	26432	54687	36008	29722	118204	26924	41886	141454	1815887	64450
BLACKBURN	1360836	266121	48957	110494	50742	41822	210530	42333	54563	202886	2923841	106200
BLACKPOOL	1609804	610067	103724	195609	129707	36195	296356	98835	86974	252765	3863320	144500
BOLTON	2269342	451749	113095	130665	104392	84048	298142	87995	89068	320290	4509913	161500
BOOTLE	995441	231186	54449	51198	53990	30490	84618	31851	86028	155283	2115240	81550
BURNLEY	1200599	288216	79200	70645	75455	31369	151342	51542	52895	197451	2747033	81360
BURY	603120	177556	45909	63895	32628	19187	82462	31485	51093	54564	1344989	58090
LIVERPOOL	10342250	2467794	364822	772746	582178	511710	1030029	569834	537738	2593578	22640896	762400
MANCHESTER	10222408	2458990	459729	820995	525934	463445	1248625	447418	374866	1758469	21589770	676255
OLDHAM	1593433	357225	63329	103608	76064	72105	204704	79742	85625	237452	3228658	118300
PRESTON	1575986	369096	90657	112505	68991	40681	116358	43565	61292	249072	3283316	115100
ROCHDALE	1109019	286600	72108	83994	59862	41705	214849	68920	59245	185304	2623541	84890
ST. HELENS	1370754	364543	119045	90750	97892	34955	149481	52044	61895	201353	2763084	110600
SALFORD	2052460	588033	123417	140742	129367	105391	244526	75290	105096	421728	4656730	163600
SOUTHPORT	830865	373302	72670	74231	154094	15997	159775	55158	44928	194810	2167564	81760
WARRINGTON	1027566	291045	100428	92159	40670	62802	112993	37209	49639	154482	2362992	79760
WIGAN	1018174	279486	85919	74545	67838	43834	119808	28416	52740	174418	2466802	81330
LEICESTER	4521352	930782	290514	209371	278782	250342	394320	100440	114470	470912	8785980	277700
GRIMSBY	1248532	247580	81078	90377	32981	50881	124017	32707	44339	219919	2500882	96380
LINCOLN	882143	164987	45571	65838	38068	43384	104774	27670	43610	146556	2018470	72220
GREAT YARMOUTH	762726	195799	27211	26159	70848	20290	84240	25713	39428	121897	1810507	51400
NORWICH	1711475	423322	187213	81486	89898	63010	223966	32937	60746	246308	3446998	118800
NORTHAMPTON	1138343	397711	134711	96311	90172	41792	232687	272314	58081	193846	2781591	100700
NEWCASTLE UPON TYNE	3382568	589954	55172	189793	120945	145838	576060	174349	152196	568733	7108455	272400

TOTAL EXPENDITURES FOR YEAR 1958

ENGLAND AND WALES 1958

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
TYNEMOUTH	697270	139470	13720	46748	40164	40101	83466	30306	46399	133145	1469901	68700
NOTTINGHAM	4199232	912925	246141	233894	203216	138635	358227	118949	139234	676671	8475922	313000
OXFORD	1370272	435401	161418	74361	72797	59910	197174	47071	61386	204037	3105879	104100
BATH	1361335	213221	45621	69202	49478	35794	152932	25897	46155	144268	2534014	80400
BURTON UPON TRENT	743565	223280	124182	43394	21540	27368	52648	19894	39036	37958	1479690	49230
SMETHWICK	961828	218766	36732	74718	40049	37086	69632	31541	43663	63275	1798113	72690
STOKE-ON-TRENT	4036229	896580	369478	243099	169775	142381	377327	101194	108448	403783	7856466	271100
WALSALL	1387810	305860	95468	70821	68830	68967	136751	33269	59664	194096	2736876	115000
WEST BROMWICH	1181066	293843	108683	76367	65838	46903	142087	321185	48413	64152	2236908	93380
WOLVERHAMPTON	2193027	469724	164240	140188	86877	54877	259685	54594	66530	261612	4162166	147800
IPSWICH	1262748	295992	76215	68262	50349	45760	153962	30465	51881	178736	2791078	113400
CROYDON	3126329	788220	194152	193748	180851	115867	415324	80496	215464	0	6405492	249500
BRIGHTON	2102754	557259	22431	152953	229838	94481	445480	73990	92747	368113	4876571	159700
EASTBOURNE	798393	214780	28301	62873	76891	22578	101614	29700	38202	150085	1833813	57680
HASTINGS	696163	243288	27078	39657	92642	35643	104729	32947	44759	159919	1832927	64220
BIRMINGHAM	14653525	3650506	710150	1197395	869178	615664	2078318	523246	634664	2542308	32377207	1110800
COVENTRY	4439985	680089	210603	219699	106289	152991	282213	69250	143539	426423	8410674	272600
DUDLEY	812221	170296	31767	51792	53672	34103	93553	29938	37772	129780	1616406	64530
WORCESTER	1118819	151896	51523	37017	32593	38896	125136	19675	35189	142155	2062538	63970
KINGSTON UPON HULL	3896812	979542	335479	316879	126623	180225	401620	117029	203400	713075	8502795	301100
MIDDLESBROUGH	2175770	386532	64038	137648	88320	96527	212373	73985	85995	301291	4177393	152500
BARNSLEY	1289846	212404	36324	78720	38762	31382	225640	30143	48087	152990	2547386	75580
BRADFORD	3601321	1138786	506333	213824	129469	259224	516578	189187	129870	653840	8079589	287800
DEWSBURY	717035	163609	54713	31469	49422	20879	113449	31446	40861	97564	1494850	53330
DONCASTER	1373610	369553	136240	63927	75794	42752	230648	39319	52211	158706	3143969	84170
HALIFAX	1228706	316261	95175	114002	75027	47482	216355	65849	61057	198499	2643495	95250
HUDDERSFIELD	1718370	456003	216719	107917	65712	83121	246937	70165	61513	254247	3626991	128100
LEEDS	6171263	1551147	370270	554137	290468	315117	1282794	302770	235901	1040766	14152730	511600
ROTHERHAM	1309658	236238	67729	73255	43720	66885	110546	36893	59136	151457	2506006	84030
SHEFFIELD	6032652	1724754	316972	618568	417011	192696	867555	241920	192021	923244	15242225	498800
WAKEFIELD	730061	170805	41108	46147	38263	27970	115909	27364	49406	101971	1562809	59740
YORK	1472333	325713	102040	89157	82611	64615	155871	42508	44388	218480	3015736	105600
CARDIFF	3504587	637924	82130	171146	249627	137619	335717	62718	99710	508995	6661010	253300
MERTHYR TYDFIL	914985	148483	23861	43416	47241	20311	109106	17985	32441	125747	1796521	59300
SWANSEA	2260344	510859	154843	124297	148773	71104	290847	65333	102187	276946	4540422	163300
NEWPORT	1460738	265416	28357	57083	63507	56796	161768	22561	72527	221685	2946840	104200

TOTAL EXPENDITURES FOR YEAR 1958

METRO BOROUGHS OF LONDON 1958

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
BATTERSEA	0	321038	13579	128063	9128	0	145158	28294	0	0	1847531	110400
BERMONDSEY	0	240313	14139	69969	37440	0	189063	22917	0	0	1466477	54450
BETHNAL GREEN	0	198509	4385	64495	11952	0	104186	20710	0	0	988176	49830
CAMBERWELL	0	372908	34834	164395	59256	0	265283	49459	0	0	2929584	177300
CHELSEA	0	163129	20286	72006	10070	0	163824	26186	0	0	1874826	50190
DEPTFORD	0	199767	10062	65333	32094	0	121768	21092	0	0	1134798	70220
FINSBURY	0	275382	20380	56125	46336	0	131824	23739	0	0	2118266	34960
FULHAM	0	332797	9325	141417	60221	0	143519	31982	0	0	2034404	114700
GREENWICH	0	216097	12923	81933	21649	0	105513	34506	0	0	1585423	89180
HACKNEY	0	446246	47056	168021	35890	0	285721	43777	0	0	2824176	163400
HAMMERSMITH	0	274925	18791	108248	34946	0	145495	48960	0	0	2081393	110200
HAMPSTEAD	0	249675	36797	117801	4399	0	215266	36098	0	0	2147660	96480
HOLBORN	0	146243	4409	50582	17597	0	121470	38502	0	0	2762478	21870
ISLINGTON	0	574193	18419	289035	60018	0	235087	80800	0	0	3239398	225800
KENSINGTON	0	400036	26454	216295	25200	0	306232	82421	0	0	4368836	165700
LAMBETH	0	388427	36403	210473	28460	0	324366	108109	0	0	3856529	223600
LEWISHAM	0	445595	38228	205156	44398	0	262489	93463	0	0	3311046	221000
PADDINGTON	0	364867	25794	149661	32490	0	192130	75677	0	0	2708733	115700
POPLAR	0	294810	19118	94726	27003	0	209307	34642	0	0	4980695	64410
ST. MARYLEBONE	0	387403	13649	199237	10883	0	393863	43175	0	0	4980695	71410
ST. PANCRAS	0	358904	16624	157382	33196	0	263360	33381	0	0	3204284	130800
SHOREDITCH	0	161676	8710	56896	25677	0	114974	23143	0	0	1206149	43330
SOUTHWARK	0	332840	7407	148227	39683	0	193607	54545	0	0	1894645	89920
STEPNEY	0	419515	48990	165068	35490	0	263180	65549	0	0	2361561	96360
STOKE NEWINGTON	0	132749	5476	50539	2862	0	35107	16736	0	0	826801	50480
WANDSWORTH	0	646076	70807	287916	68885	0	307005	158352	0	0	4874609	337900
WESTMINSTER	0	700568	73316	342630	34806	0	612701	180154	0	0	14358255	95440
WOOLWICH	0	437670	15317	165105	71312	0	197429	73385	0	0	2759216	144600

TOTAL EXPENDITURES FOR YEAR 1958

SCOTLAND 1958

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
ABERDEEN	2985198	0	0	0	0	135779	185719	117099	81634	330178	6634261	186350
ARBROATH	79324	0	0	0	0	2529	37601	13296	7959	15696	326399	19942
DUNDEE	2383949	0	0	0	0	52846	519534	148901	72344	357039	4934498	180166
AYR	187256	0	0	0	0	0	43003	40015	10549	98580	754674	43952
KILMARNOCK	180525	0	0	0	0	26507	74020	31810	10946	95570	1049916	45139
DUMFRIES	109786	0	0	0	0	6944	37554	10377	6009	18556	415339	27640
CLYDEBANK	193959	0	0	0	0	15120	62068	40472	17594	46234	106638	50714
DUMBARTON	99773	0	0	0	0	11974	35270	19521	7708	23745	464592	26726
DUNFERMLINE	200790	0	0	0	0	25807	70344	30971	11444	39327	877205	46200
KIRKCALDY	228564	0	0	0	0	22858	43048	52028	13204	39737	988718	52061
INVERNESS	133606	0	0	0	0	7303	58989	27777	21293	55008	538284	28309
GLASGOW	15840519	0	0	0	0	467286	1456051	1242846	660862	2985527	38702122	1078958
AIRDRIE	150370	0	0	0	0	7780	30136	16676	8968	47728	659433	32800
COATBRIDGE	243679	0	0	0	0	9611	70278	23512	14181	91117	1016994	52918
HAMILTON	191980	0	0	0	0	19085	66079	31289	12271	72988	795569	41330
MOTHERWELL AND WISHAW	327942	0	0	0	0	11762	64694	53162	0	117486	1244648	72153
RUTHERGLEN	111501	0	0	0	0	3203	28075	18902	7480	21326	487574	24397
EDINBURGH	5166501	0	0	0	0	187197	695693	378701	136662	1292789	11153093	467410
PERTH	168428	0	0	0	0	13853	44501	34051	13973	78069	799321	40964
GREENOCK	283128	0	0	0	0	32880	93377	62600	29476	186131	1373178	77968
PAISLEY	340521	0	0	0	0	24506	96266	57425	35876	188618	1926169	96540
PORT GLASGOW	86584	0	0	0	0	8896	34413	16819	8901	20761	395879	23506
FALKIRK	159782	0	0	0	0	15212	44237	22933	10728	26572	717194	37271
STIRLING	117095	0	0	0	0	14079	31140	12331	7548	20968	470806	27314

TOTAL EXPENDITURES FOR YEAR 1959

ENGLAND AND WALES 1959

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
READING	1921595	338793	112052	67330	85428	60604	190379	44956	46927	252859	3681254	118200
BIRKENHEAD	1926105	406043	62365	152947	96301	48491	192100	69384	110161	445070	3874748	143400
CHESTER	850410	190270	52000	55182	39415	38531	108761	22526	44640	57617	1673515	59700
STOCKPORT	1814169	389179	85031	133596	118439	64237	144283	55721	69455	263694	3391112	141500
WALLASEY	1320986	286783	15166	85755	76801	38182	83326	47468	61296	209267	2904474	103200
CARLISLE	986772	188100	43255	57805	40017	36772	83252	34849	50690	129502	1905971	69800
DERBY	1955055	622333	276347	115315	125777	59711	213395	48073	99735	282384	4048637	131500
EXETER	1014800	210817	57476	52659	45428	36550	162434	34551	53559	163322	2403835	77400
PLYMOUTH	2636991	545327	109880	176858	149556	128695	533965	83890	125133	429085	5932486	216300
DARLINGTON	1146504	215690	53822	68952	38057	29277	102971	37675	42867	80209	2114513	83300
GATESHEAD	1397365	251969	28305	95087	73532	75528	178755	60122	51410	180314	2996144	109100
SOUTH SHIELDS	1405777	300136	22890	87146	126080	63287	169151	47350	68196	198232	2826892	108700
SUNDERLAND	2763578	400283	56481	167945	89208	121235	299875	65924	90927	278115	4996341	186600
WEST HARTLEPOOL	971831	138328	12523	44083	48476	56146	75986	31473	43733	73309	1777789	75400
EAST HAM	1741055	314439	61035	100390	62857	75853	134937	23027	71115	0	3573296	109900
SOUTHEND-ON-SEA	2091439	565572	151719	130607	179069	62537	476666	43370	73349	392508	5036763	158800
WEST HAM	2335998	491856	144633	131539	60513	94531	302283	42280	163250	0	5169871	164300
BRISTOL	6224748	1400669	497612	342021	302817	226069	760481	154161	273990	1082502	13548221	436600
GLOUCESTER	1281046	210491	75739	43602	30344	28912	125313	27231	58203	63532	2285988	68300
BOURNEMOUTH	1652304	566271	86422	137428	234887	68533	295437	90987	97323	286867	4048398	144700
PORTSMOUTH	2876593	554749	184616	147524	122510	83485	324637	57083	127846	523602	5812133	220300
SOUTHAMPTON	3027891	561427	140837	157805	148011	88996	307384	69892	129976	464925	5775844	200000
CANTERBURY	625745	71120	17151	22537	18641	13724	54398	11438	19320	34291	1061435	30000
BARROW-IN-FURNESS	906617	196201	33666	62154	34641	32893	112650	30034	57205	156880	1983545	64470
BLACKBURN	1526823	284516	51124	121309	54300	44548	254373	60064	59465	221572	3202614	105900
BLACKPOOL	1725504	617927	95194	195415	144251	33684	295109	104569	89402	285836	4053906	143600
BOLTON	2501078	512380	126194	131399	103779	85792	308747	107590	91498	331600	4832084	160700
BOOTLE	1063249	216993	53152	51629	54640	29376	85385	33048	91552	167680	2214383	82000
BURNLEY	1255112	300632	80881	75355	80438	31810	167763	52475	54941	210577	2878671	81030
BURY	654774	185751	48470	67699	35684	19143	67021	30988	52286	58176	1395666	58230
LIVERPOOL	11041794	2569537	380265	854648	539120	514844	1092006	595600	572567	2807918	24001480	757500
MANCHESTER	11098523	2706674	521445	848520	597941	503761	1306157	463219	389781	1938710	23486031	672300
OLDHAM	1658603	367016	67288	107229	77986	81287	211977	84381	88208	255045	3351833	117800
PRESTON	1743941	387975	101852	105268	80909	47944	121842	44078	63911	267336	3490629	114200
ROCHDALE	1196238	301234	72256	88031	68336	42064	198449	75884	62178	205848	2757496	84690
ST. HELENS	1482362	439107	191274	98076	97332	38712	162314	58792	70375	221950	3038125	110700
SALFORD	2213003	612861	121813	142894	143401	115438	252932	75484	112680	457760	4962023	162000
SOUTHPORT	899053	358271	71790	79482	133167	16718	161899	53062	45580	204747	2229117	81370
WARRINGTON	1117064	341548	127921	93978	61626	57592	112584	39017	51592	172746	2538431	79230
WIGAN	1088316	331265	117817	76956	79007	47469	97388	33346	66167	185899	2572564	81160
LEICESTER	4850399	960765	292595	214213	285754	264587	286831	107219	123121	530407	9359871	275400
GRIMSBY	1354309	255861	82290	93201	33872	52073	129515	36831	46930	241550	2673742	97110
LINCOLN	948645	176249	48683	70401	41945	39629	107754	29304	45588	156973	2097850	73390
GREAT YARMOUTH	808155	210220	29259	26661	80307	21068	80460	27779	41122	131406	1889275	51300
NORWICH	1822875	476205	240222	80609	88187	63614	224482	39556	60705	259157	3654852	118400
NORTHAMPTON	1260056	427208	148029	100706	107690	40236	193104	45528	62801	212907	2991597	100300
NEWCASTLE UPON TYNE	3667874	612159	54413	196841	125011	144926	594627	181774	153879	607008	7536425	271100

TOTAL EXPENDITURES FOR YEAR 1959

ENGLAND AND WALES 1959

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
TYNEMOUTH	762898	142467	17113	47773	35796	42140	110838	33964	52672	142281	1623879	69300
NOTTINGHAM	4643388	999315	303537	235133	224224	141395	385771	127892	142702	730367	9329638	313300
OXFORD	1505319	384763	170312	73414	72796	61873	211501	48746	63865	233180	3318357	104000
BATH	1415551	231882	47502	77594	53618	36642	156394	25442	49699	157706	2649284	80800
BURTON UPON TRENT	821404	223384	120390	44148	24651	27749	57340	20245	39981	43983	1599585	49380
SMETHWICK	994966	218764	37056	78448	38157	35314	56974	30105	45475	67360	1838813	71730
STOKE-ON-TRENT	4456890	931056	363999	252332	188439	150654	417210	114619	112544	441633	8534718	270800
WALSALL	1522169	332360	102984	76555	74891	68160	140647	35044	60267	215156	2961327	115100
WEST BROMWICH	1311221	328226	138432	75546	64624	51177	147864	37867	50646	64471	2452087	93590
WOLVERHAMPTON	2321696	480875	168517	141229	83644	55748	322859	65731	71568	276196	4450426	146100
IPSWICH	1388899	296005	56929	75800	54241	42068	151649	32536	53597	197869	2897521	114600
CROYDON	3506457	840743	202987	208849	199693	119397	446972	90082	90194	141032	6978890	249000
BRIGHTON	2241837	495924	28064	128085	219736	97745	448756	73056	98617	397188	5036928	160000
EASTBOURNE	868292	220403	28050	66981	76116	23930	98858	32236	38826	158830	1967285	57800
HASTINGS	741322	243305	22956	40415	93704	36423	101495	30743	54867	168231	1893978	63900
BIRMINGHAM	16180571	3745417	715868	1287975	899869	662544	2135477	538715	663196	2762783	34719228	1103000
COVENTRY	4843393	726624	220121	232192	116137	164124	327213	72278	153806	478732	8944335	277300
DUDLEY	876007	176089	36856	51251	54271	35092	110038	31963	44289	133929	1731940	64200
WORCESTER	1184168	158426	52690	39276	34444	39083	117713	22050	37685	148400	2130282	64000
KINGSTON UPON HULL	4319532	1072761	388736	339586	130959	183985	432790	134315	210893	761633	9260022	301800
MIDDLESBROUGH	2356627	397129	63565	129800	100242	102882	239833	76723	103346	320956	4484258	153800
BARNSLEY	1388114	226084	40596	82283	40942	31902	302726	33102	51997	162332	2786281	75400
BRADFORD	3934507	1160064	526788	230893	138813	197496	434106	204639	142265	698746	8731689	289100
DEWSBURY	745327	167570	53019	33191	52755	21883	128913	32520	43851	99396	1589113	53390
DONCASTER	1543562	409026	138671	68859	83373	47469	265493	40014	53573	168994	3457704	84610
HALIFAX	1321316	319180	91330	114263	77475	48513	208582	72561	85640	217770	2800994	94980
HUDDERSFIELD	1974759	529174	271247	111753	76006	87830	266439	80019	62816	262471	4021169	128500
LEEDS	6778635	1587179	396951	567389	273495	340650	1309762	309308	256352	1108593	14789417	513300
ROTHERHAM	1424347	248530	75446	74268	47257	67260	123043	42772	64689	160678	2710203	84560
SHEFFIELD	6423482	1828361	338553	670950	438016	207628	892335	245617	203116	971243	16018495	499400
WAKEFIELD	777917	180194	42348	50856	39991	27440	119177	32559	49278	105144	1649358	59860
YORK	1559441	338393	94146	99969	87632	64287	172387	47789	57021	229941	3193868	104900
CARDIFF	3815976	732814	87375	177490	263591	145278	365857	66838	107176	537550	7259488	254200
MERTHYR TYDFIL	969445	157051	27334	43622	50025	23486	116551	181760	34451	129334	1911207	59300
SWANSEA	2382585	544546	161197	127675	164021	71307	304877	67914	105119	298259	4789715	164200
NEWPORT	1561125	272612	31685	52375	59477	59540	168416	22933	73833	232956	3117035	104300

TOTAL EXPENDITURES FOR YEAR 1959

METRO BOROUGHS OF LONDON 1959

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
BATTERSEA	0	306600	9621	114528	10817	0	184537	31997	0	0	1867647	108500
BERMONDSEY	0	237389	13004	68914	38309	0	182296	23334	0	0	1478647	54120
BETHNAL GREEN	0	196170	4216	64962	11277	0	88889	21018	0	0	991210	48960
CAMBERWELL	0	400889	37282	167460	65077	0	261773	53307	0	0	3021769	176100
CHELSEA	0	157673	18176	69240	11115	0	127653	37549	0	0	1908648	49520
DEPTFORD	0	193784	8713	62488	31365	0	135813	26953	0	0	1073798	69660
FINSBURY	0	307816	31421	59588	46701	0	132429	22546	0	0	2157280	34030
FULHAM	0	344173	10877	141302	66298	0	148475	30698	0	0	2069701	113300
GREENWICH	0	223729	13530	84239	25499	0	116280	38779	0	0	1636827	88970
HACKNEY	0	469452	57375	171084	37476	0	289646	43964	0	0	2885552	163200
HAMMERSMITH	0	267833	12108	107476	32376	0	148089	61964	0	0	2117930	108900
HAMPSTEAD	0	262439	46170	115575	4308	0	212913	36981	0	0	2112239	96810
HOLBORN	0	154488	7307	53676	18217	0	115917	36505	0	0	2864911	21370
ISLINGTON	0	596062	21334	298754	63353	0	220802	87091	0	0	3261629	223400
KENSINGTON	0	395409	27770	221165	21440	0	301040	81246	0	0	4489015	166500
LAMBETH	0	420606	44249	217413	27678	0	322391	96056	0	0	3912694	223300
LEWISHAM	0	460467	40790	198428	53308	0	270674	81867	0	0	3345442	221000
PADDINGTON	0	370202	27047	158045	33153	0	186951	65833	0	0	2716346	113400
POPLAR	0	283996	19316	88319	24147	0	169428	36218	0	0	1359101	63540
ST. MARYLEBONE	0	398401	19604	187817	10868	0	423371	43006	0	0	4976661	70430
ST. PANCRAS	0	382106	15259	163842	35707	0	248587	60740	0	0	3291026	128700
SHOREDITCH	0	161212	7807	57134	25849	0	134104	26011	0	0	1254647	43330
SOUTHWARK	0	343898	9920	156064	38796	0	196898	54835	0	0	1889091	88720
STEPNEY	0	411510	53601	153792	37072	0	318073	73956	0	0	2435945	94900
STOKE NEWINGTON	0	136583	7929	51596	2360	0	39273	16621	0	0	878278	50200
WANDSWORTH	0	664293	66295	295742	71307	0	331972	161894	0	0	4917132	338800
WESTMINSTER	0	702538	88510	343357	29277	0	592301	172980	0	0	15075921	94640
WOOLWICH	0	476684	14076	177555	74644	0	206699	72386	0	0	2829032	144800

TOTAL EXPENDITURES FOR YEAR 1959

SCOTLAND 1959

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
ABERDEEN	3117274	0	0	0	0	140512	180125	125188	81636	354172	6941889	186796
ARBROATH	86318	0	0	0	0	2828	42420	13491	8453	17019	356700	20146
DUNDEE	2551000	0	0	0	0	55414	681796	154285	75108	384601	5339590	180869
AYR	188682	0	0	0	0	0	36993	43423	12236	106931	749000	44440
KILMARNOCK	183056	0	0	0	0	26904	67674	33381	12987	98982	1068007	45776
DUMFRIES	117550	0	0	0	0	7738	46135	10387	7191	19750	452635	27780
CLYDEBANK	208662	0	0	0	0	15364	88225	41813	14287	50219	1087032	51503
DUMBARTON	108240	0	0	0	0	12343	41896	21853	8099	25742	515647	26961
DUNFERMLINE	218892	0	0	0	0	26858	66576	31688	12553	39930	905347	46768
KIRKCALDY	247945	0	0	0	0	26372	43947	69008	14371	39942	1034209	52407
INVERNESS	130307	0	0	0	0	7884	65241	28480	21519	57035	564169	28562
GLASGOW	17225174	0	0	0	0	485688	1868471	1311083	732212	3257936	41699153	1076614
AIRDRIE	153531	0	0	0	0	8458	31029	17999	9731	56204	676848	33397
COATBRIDGE	250738	0	0	0	0	10798	74236	26009	15592	99779	1069089	53754
HAMILTON	193523	0	0	0	0	17539	72429	36550	13144	84092	816800	41612
MOTHERWELL AND WISHAW	334678	0	0	0	0	12515	78821	58988	0	125376	1314345	72733
RUTHERGLEN	111940	0	0	0	0	3888	39002	19906	8378	20504	505933	24600
EDINBURGH	5540071	0	0	0	0	199907	809975	409515	134074	1350602	12000171	469399
PERTH	174658	0	0	0	0	13182	48885	35262	14368	85517	829621	41116
GREENOCK	282945	0	0	0	0	34818	83647	62727	36057	197507	1413790	78350
PAISLEY	341313	0	0	0	0	24226	103379	61827	43961	195374	1996507	96936
PORT GLASGOW	86701	0	0	0	0	8882	35173	17352	10916	21891	419636	23530
FALKIRK	162215	0	0	0	0	14866	52767	22469	11143	28447	752861	37567
STIRLING	119902	0	0	0	0	16171	29441	13264	7796	22623	498007	27085

TOTAL EXPENDITURES FOR YEAR 1960

ENGLAND AND WALES 1960

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
READING	2219855	412410	136226	97261	97062	64711	240688	56796	64731	267109	4164778	118110
BIRKENHEAD	2217856	416424	63346	143293	109686	48083	194180	71555	112014	466739	4294381	144280
CHESTER	967077	201618	52394	57065	38669	37131	123102	23941	46167	60427	1930305	60090
STOCKPORT	2208601	440163	87896	141936	148298	70333	174387	61474	74712	290391	4107890	141440
WALLASEY	1491483	286531	17192	87938	86933	41440	92619	54341	69599	226030	3249515	103450
CARLISLE	1166704	204756	46151	71678	39429	30335	96323	42997	46866	137583	2111586	69980
DERBY	2268186	645877	292019	121506	125091	62955	239887	50620	91338	286740	4538655	129430
EXETER	1164124	212025	62148	48330	41099	98397	196656	34737	54655	178454	2883584	77450
PLYMOUTH	3004549	507163	113986	153328	154804	122542	433545	85604	123770	450090	6170149	216470
DARLINGTON	1247359	233878	60060	71666	40431	36067	122198	42902	42832	85839	2460616	83660
GATESHEAD	1545161	266233	33649	96365	77561	67364	210666	63436	54156	198795	3343259	108560
SOUTH SHIELDS	1616167	292449	23488	89049	119367	62533	182951	52060	70585	202420	3313346	108600
SUNDERLAND	3190150	428130	66497	170032	95670	124656	319326	72209	94097	284720	5659766	188000
WEST HARTLEPOOL	1105254	145450	12016	47946	52701	59034	83997	31748	49188	74521	2011261	76110
EAST HAM	1962224	349994	81956	110815	63892	64967	135442	25344	85575	0	3652306	109160
SOUTHEND-ON-SEA	2364138	620457	162188	134853	210908	66398	523661	56897	78596	425005	5931865	160120
WEST HAM	2632793	511668	154545	129973	65170	94412	321077	41725	168438	0	5800870	163310
BRISTOL	6825956	1512830	515997	347715	366065	241886	805826	168863	276020	1147482	14519141	433750
GLOUCESTER	1413851	219158	78469	41624	32960	26079	149996	27870	59137	71089	2466847	68620
BOURNEMOUTH	1835817	581580	86395	142295	247505	69603	347583	99658	100358	312906	4477276	146550
PORTSMOUTH	3330243	582433	186483	161703	129102	88368	340754	61194	126980	544521	6809670	217520
SOUTHAMPTON	3517437	603853	150135	161895	162206	94869	334566	78589	137893	491936	6970221	201790
CANTERBURY	738254	74018	16265	22987	20303	12157	66680	11182	20270	37106	1248174	30560
BARROW-IN-FURNESS	1004921	215989	36700	68702	37856	35708	128565	33329	49463	166708	2791430	64580
BLACKBURN	1721591	283576	56101	113449	55008	48978	257049	59567	58247	233276	3484187	105330
BLACKPOOL	1889591	609671	92306	194089	144406	37062	345698	100961	90948	329527	4512198	143530
BOLTON	2764645	568003	157340	130385	131825	86095	308882	108776	93297	346787	5486953	159570
BOOTLE	1298180	220106	54918	54581	54772	28273	85294	32904	98552	175432	2563183	82580
BURNLEY	1394543	323229	80355	75455	84715	29611	193425	47903	56414	224944	3077136	80560
BURY	767716	196721	55150	67529	39537	19982	115521	32219	51515	64174	1742660	59290
LIVERPOOL	12685395	2687334	407845	881205	570738	531846	1533706	635300	597294	2945961	28631062	754670
MANCHESTER	11994358	2905706	633694	891400	607809	526567	1483089	445523	420822	2065159	25290377	665590
OLDHAM	1805392	377155	69409	106678	80478	82264	225632	90026	92080	267879	3755482	117250
PRESTON	2005443	398051	110624	101712	73972	53745	131259	45794	68867	274270	3961364	113460
ROCHDALE	1312438	290507	73420	88934	54373	38916	197593	70970	62791	211900	3020741	84210
ST. HELENS	1731853	471231	200204	107686	109477	40266	168414	56406	86085	237520	3580627	109610
SALFORD	2460913	640182	132933	150492	140756	112323	256266	84160	115190	492171	5434737	161170
SOUTHPORT	1004774	366222	76778	79934	121894	14713	180384	58340	48979	220579	2471385	81350
WARRINGTON	1279278	380594	115889	127690	71560	50253	102212	39961	53497	178949	2873466	78780
WIGAN	1299392	361891	127713	78842	101967	50051	123371	33499	61968	194137	3004853	80950
LEICESTER	5113399	1009956	311152	205071	306973	283653	423656	100998	125929	539265	9862504	273370
GRIMSBY	1507485	267853	78860	101511	37888	65515	144334	32157	54773	244635	3054911	97030
LINCOLN	1055557	186404	50730	71782	45994	35505	157715	29634	50412	162574	2291317	73730
GREAT YARMOUTH	972141	217167	25176	27767	85232	17974	90823	30194	46947	132648	2190099	51500
NORWICH	2013835	502347	255147	81312	94092	61074	246191	49944	65070	267560	4034404	117700
NORTHAMPTON	1463168	441402	141881	108514	116146	40858	201274	45475	69623	216702	3391183	101180
NEWCASTLE UPON TYNE	4236490	656513	68147	202084	133999	138731	629101	183640	178820	653097	8427802	268970

TOTAL EXPENDITURES FOR YEAR 1960

ENGLAND AND WALES 1960

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
TYNEMOUTH	886912	150316	12265	48421	40153	39555	97344	37526	54177	151583	1833461	70010
NOTTINGHAM	5356576	1036855	309641	242853	254034	152621	451731	127060	156746	808112	10418245	313760
OXFORD	1691155	411496	177833	76406	78261	63084	177880	52488	71143	248486	3886860	104490
BATH	1574945	255458	66659	79729	52615	35991	172671	23453	51866	171187	2949448	81640
BURTON UPON TRENT	936352	230871	126133	45050	23729	30006	50890	17735	41877	50517	1744512	49460
SMETHWICK	1141049	224992	38321	78755	39652	32827	67117	30557	46889	75969	2053726	71110
STOKE-ON-TRENT	4988153	975195	386067	258896	204297	158473	437408	114283	118462	475890	9398432	270200
WALSALL	1729125	352155	113689	78635	77085	70935	163199	37830	64301	233540	3417103	115390
WEST BROMWICH	1530094	359845	156189	79434	67276	50579	175037	22835	57009	74310	2958539	93780
WOLVERHAMPTON	2605635	526881	189388	139431	93315	55401	304888	93464	77776	296532	4815498	145160
IPSWICH	1706154	305659	63398	81570	52425	43039	153784	42180	79565	200122	3378799	115780
CROYDON	4019435	872128	194899	215112	205147	117640	456319	98029	141723	0	8021205	249690
BRIGHTON	2495996	544847	29792	129107	257939	90186	465100	76621	107825	416280	5901876	160860
EASTBOURNE	946981	256198	50015	66990	92358	24959	112746	33621	40887	171686	2100970	57940
HASTINGS	849513	229814	28422	42444	83919	35545	141996	33377	44849	180552	2136264	65130
BIRMINGHAM	17717093	3837924	748105	1301080	901304	710762	2584809	521135	665406	2930851	37787703	1095000
COVENTRY	5292257	768993	239708	245158	121800	167388	361577	75882	149836	523787	10442940	281000
DUDLEY	987984	196215	38928	50392	63632	33686	116064	30662	44574	138681	1906654	63910
WORCESTER	1358235	162158	52319	42151	36816	42718	115570	26875	41501	156949	2366649	64490
KINGSTON UPON HULL	4710491	1129160	413320	341570	146547	194826	427113	130591	225569	800542	9949514	302400
MIDDLESBROUGH	2763529	430238	72482	132716	105606	100479	231658	82531	102061	342091	5250602	154560
BARNSLEY	1590357	253096	56249	88189	41990	33214	294626	31870	54773	171145	3159954	75450
BRADFORD	4701098	1280699	592061	240264	141807	206079	473100	202692	130175	720703	9737189	289860
DEWSBURY	851782	174611	52720	34296	56784	23933	131120	34024	46631	107697	1790789	53460
DONCASTER	1702541	412328	140100	71645	87851	49672	262012	39871	56710	182298	3267198	85300
HALIFAX	1516136	333341	96457	114692	81024	56805	360208	76501	84282	223634	3182565	94900
HUDDERSFIELD	2266557	561777	287858	113718	86562	88364	281905	81645	66450	275148	4426884	129130
LEEDS	7880900	1684568	402477	596976	309860	351453	1400872	364513	244650	1177647	16573083	514760
ROTHERHAM	1563559	267791	87253	75198	49910	73062	129308	44641	70009	180836	3069503	85070
SHEFFIELD	7002787	1897131	350454	661974	444485	217340	2632359	254493	217315	1039300	19864465	499610
WAKEFIELD	908083	187245	41808	53692	45695	30833	122897	34494	63578	111949	1975210	59840
YORK	1769541	351996	100385	100984	88301	69493	168485	44253	63238	244037	3501413	104120
CARDIFF	4363894	763344	89759	181228	264531	154334	496063	73523	103017	554505	8801614	255470
MERTHYR TYDFIL	1043083	159494	32564	45411	41967	21376	100618	19556	37468	130753	1991735	59230
SWANSEA	2632344	559300	162615	133380	166344	76204	320738	68779	110484	308506	5348571	165560
NEWPORT	1812082	292184	31016	58247	67625	60935	184047	27292	78532	248760	3705840	104580

TOTAL EXPENDITURES FOR YEAR 1960

METRO BOROUGHS OF LONDON 1960

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
BATTERSEA	0	295834	9269	113045	11763	0	208914	29592	0	0	2010633	107120
BERMONDSEY	0	244432	13636	71042	41837	0	191991	26586	0	0	1574014	53510
BETHNAL GREEN	0	207579	4762	63090	12154	0	94755	20272	0	0	1076695	47580
CAMBERWELL	0	422260	36877	182507	70574	0	274753	53344	0	0	3374663	175020
CHELSEA	0	153067	9784	71594	10550	0	125025	49070	0	0	1928356	49140
DEPTFORD	0	201780	8399	64753	36187	0	136115	20510	0	0	1149519	69330
FINSBURY	0	316317	32077	54672	47295	0	135336	20063	0	0	2473649	33710
FULHAM	0	353407	13196	146606	63600	0	137546	32291	0	0	2197527	112960
GREENWICH	0	238039	17009	89451	26800	0	118612	38006	0	0	1820813	88310
HACKNEY	0	447614	55694	165447	37145	0	267354	43816	0	0	3124380	163050
HAMMERSMITH	0	285399	12406	108124	31902	0	139325	57857	0	0	2304484	108290
HAMPSTEAD	0	272065	47443	117403	4455	0	232267	36003	0	0	2191444	98080
HOLBORN	0	157517	4194	53876	26056	0	130094	38280	0	0	3087512	21000
ISLINGTON	0	590484	23497	297734	63303	0	231754	91720	0	0	3427153	222940
KENSINGTON	0	396932	27654	221928	22171	0	285542	72936	0	0	4382844	167240
LAMBETH	0	441520	43828	217812	39401	0	338964	78084	0	0	4233623	224080
LEWISHAM	0	476135	44372	196823	63394	0	245942	83343	0	0	3628077	221330
PADDINGTON	0	376757	24533	159169	35966	0	205375	61411	0	0	2680365	113350
POPLAR	0	300545	18927	89738	28598	0	234666	41890	0	0	1618672	63340
ST. MARYLEBONE	0	397423	15800	191232	12166	0	371171	39475	0	0	5263346	69640
ST. PANCRAS	0	377385	12788	165982	41451	0	259263	51384	0	0	3590833	127710
SHOREDITCH	0	167689	8140	62024	29068	0	141014	27251	0	0	1342909	42870
SOUTHWARK	0	358398	7159	162752	45746	0	196802	44340	0	0	2084220	88690
STEPNEY	0	417313	47626	151171	34492	0	268964	53880	0	0	2606541	93850
STOKE NEWINGTON	0	141247	4364	54654	2473	0	51683	15678	0	0	913497	50240
WANDSWORTH	0	648143	60167	286541	75489	0	343749	179051	0	0	5238235	338800
WESTMINSTER	0	746879	90903	336846	43110	0	645626	162461	0	0	16610371	92940
WOOLWICH	0	516448	17180	170519	79609	0	218003	75965	0	0	3248079	145470

TOTAL EXPENDITURES FOR YEAR 1960

SCOTLAND 1960

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
ABERDEEN	3117274	0	0	0	0	140512	180125	125188	81636	354172	6941889	187348
ARBROATH	243296	0	0	0	0	2834	41648	14165	11585	17645	545736	20196
DUNDEE	2729263	0	0	0	0	59553	697129	168902	104747	393976	5716296	182399
AYR	534812	0	0	0	0	0	43833	45181	16786	109508	1122187	44785
KILMARNOCK	523990	0	0	0	0	29045	78242	32842	16263	104303	1423209	46390
DUMFRIES	361396	0	0	0	0	8168	47285	12633	9908	19744	731744	27862
CLYDEBANK	650982	0	0	0	0	16432	106351	42525	23648	57396	1589445	51918
DUMBARTON	344200	0	0	0	0	14447	40285	24722	11127	30175	788804	27118
DUNFERMLINE	622768	0	0	0	0	26469	70766	33059	18938	43666	1339418	47438
KIRKCALDY	708694	0	0	0	0	22081	49484	53894	21724	44388	1533822	52515
INVERNESS	385904	0	0	0	0	7596	74748	30884	33004	61017	866277	28777
GLASGOW	17855795	0	0	0	0	498305	1867296	1274404	747633	3439178	44757418	1068857
AIRDRIE	444628	0	0	0	0	7849	39319	18507	13020	57226	1031703	33908
COATBRIDGE	734464	0	0	0	0	11215	63461	27406	21384	106248	1618497	54566
HAMILTON	559543	0	0	0	0	17599	72453	36898	17514	90707	1232715	42042
MOTHERWELL AND WISHAW	971580	0	0	0	0	10748	85407	64510	0	135370	2066404	73285
RUTHERGLEN	320956	0	0	0	0	3391	37242	20428	11761	22330	739142	24938
EDINBURGH	5947662	0	0	0	0	214165	898138	422519	195456	1377911	12859881	471585
PERTH	511073	0	0	0	0	14264	54376	36739	20347	88005	1211226	41310
GREENOCK	851717	0	0	0	0	34368	122237	62826	50992	206628	2150494	78089
PAISLEY	1034094	0	0	0	0	23828	111327	63326	62566	204061	2688626	97150
PORT GLASGOW	263979	0	0	0	0	8874	34021	17346	15590	24367	607295	23465
FALKIRK	459064	0	0	0	0	15488	55998	24550	15405	30688	1104017	37814
STIRLING	341298	0	0	0	0	15627	36791	14699	11120	24516	762273	27265

TOTAL EXPENDITURES FOR YEAR 1961

ENGLAND AND WALES 1961

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
READING	2337105	470771	178827	96326	85822	65226	262175	63029	68197	301552	4773352	121040
BIRKENHEAD	2379009	426310	68104	135014	113258	48727	210212	72246	118918	514659	4626918	141750
CHESTER	1062727	206305	58609	60481	40427	37333	129555	23987	51232	66433	2022286	59060
STOCKPORT	2308793	451588	90262	145116	152618	72884	198076	64703	76527	322354	4332562	142080
WALLASEY	1583550	317246	19960	87700	90911	44827	102541	48762	74442	247155	3321824	103240
CARLISLE	1241754	218364	50859	76369	40700	28517	103607	43464	53245	147799	2265982	70610
DERBY	2334042	725737	323704	123964	167039	68625	287314	53974	102129	324528	5141006	131790
EXETER	1263326	231038	71562	53724	44028	35833	236978	36229	60089	202354	3161457	78570
PLYMOUTH	3048323	534880	119832	149400	174165	139765	489881	91019	134199	521404	6497186	212780
DARLINGTON	1389707	239658	64620	77483	36318	39595	104058	41077	46638	94783	2652660	84050
GATESHEAD	1779030	281436	55514	98832	66923	58003	215391	63571	58943	231265	3818981	103290
SOUTH SHIELDS	1787558	319521	24819	95866	133365	60914	190569	57458	75638	232658	3487649	109350
SUNDERLAND	3531921	447003	64403	174886	99874	133815	325915	74497	103196	324239	6163106	189600
WEST HARTLEPOOL	1220243	164101	12030	50000	65263	61442	104328	35161	55775	88225	2357863	77390
EAST HAM	1967220	382310	103246	119784	62006	61503	138593	24415	86934	0	3674768	105470
SOUTHEND-ON-SEA	2609864	680185	174877	149481	234579	74619	571324	58518	84099	495101	6705408	164620
WEST HAM	2826066	536295	163212	137737	64058	101550	341329	46775	181385	0	6093157	156720
BRISTOL	7349407	1348092	428664	357516	257853	245979	803345	173001	300246	1286780	14821663	436000
GLOUCESTER	1559583	242856	91588	46763	35470	28136	162533	29334	67680	94746	2722665	69780
BOURNEMOUTH	2003385	585420	85546	144200	245124	71560	322412	106583	112221	368805	4763161	149000
PORTSMOUTH	3612462	648905	189319	181441	150051	92342	383158	62665	138147	612134	7387848	227930
SOUTHAMPTON	3875137	656061	162464	167597	173941	105783	351754	81451	148884	550757	7636811	204000
CANTERBURY	801831	81683	18662	25712	23615	16460	70848	12228	22390	42968	1365925	30780
BARROW-IN-FURNESS	1035638	231915	37685	66884	37912	38962	130745	32477	54694	179820	2882748	64710
BLACKBURN	1808993	289767	57917	113838	54038	54317	255501	59254	68662	260847	3711960	105930
BLACKPOOL	2024258	645823	92230	210397	152750	42200	275357	102106	105240	392110	4924286	150000
BOLTON	2996327	617227	167938	146048	147510	88766	366954	109126	99759	388637	5936551	160740
BOOTLE	1385639	234111	55102	56152	62312	28613	86772	35296	105885	199056	2862680	82680
BURNLEY	1470928	341458	88518	77381	86995	33379	182902	48687	59698	244901	3226438	80590
BURY	862725	207188	55903	70839	43130	19347	106711	33615	57052	67660	1840485	60270
LIVERPOOL	13025258	2814775	445234	914342	590653	551539	1615745	681795	689666	3344019	30164208	745810
MANCHESTER	12545821	2968491	676207	927499	617337	530196	1508463	467333	461229	2379060	26586923	660300
OLDHAM	1973613	394161	68740	113462	95063	87159	219586	95870	101143	299301	4123265	115280
PRESTON	2117460	422205	105988	105238	77734	53911	128002	49538	72801	304229	4184272	113170
ROCHDALE	1422732	307665	82005	89970	58845	39621	206094	72875	72254	261139	3241368	85890
ST. HELENS	1844724	493053	211725	114490	111964	42233	181950	65087	96859	264579	3676944	108480
SALFORD	2641153	693275	148081	175841	151430	127057	256675	83284	123167	556461	5781456	154910
SOUTHPORT	1052428	381242	79302	86966	126742	14657	183255	60147	55915	249731	2667792	81020
WARRINGTON	1339827	347822	103809	102969	63750	56022	91662	41410	64444	190183	2963088	75980
WIGAN	1379811	306638	102250	84285	98441	54037	136801	31671	67164	217786	3247669	78910
LEICESTER	5450596	1080497	348940	229629	301633	280824	485014	93373	137624	615343	10852395	273130
GRIMSBY	1647715	2915519	84283	114181	39791	64216	145482	35280	60270	271267	3328546	96520
LINCOLN	1173474	190532	53629	71060	47594	39260	173561	30541	59185	183783	2497347	77140
GREAT YARMOUTH	1039965	228400	28594	31219	86248	18959	95439	29177	49436	150161	2332812	52620
NORWICH	2062487	542150	281385	85074	95019	67013	268774	53821	68511	294610	4261530	119650
NORTHAMPTON	1566460	410287	133133	113436	86558	45806	202002	46872	65016	247823	3492382	104320
NEWCASTLE UPON TYNE	4718931	684750	59304	211702	140753	153595	646501	183250	183209	749128	9572826	267230

TOTAL EXPENDITURES FOR YEAR 1961

ENGLAND AND WALES 1961

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
TYNEMOUTH	968667	151758	15183	51646	39563	40298	146939	38978	61743	174595	1996197	70080
NOTTINGHAM	5733757	1189287	408852	259874	283508	157455	463102	155495	161191	890677	11208837	313280
OXFORD	1873648	419360	168438	89648	81120	73394	191561	56115	70696	279944	4341441	106410
BATH	1800998	248372	50210	85258	53084	39282	212023	31310	63216	184031	3300496	81550
BURTON UPON TRENT	983124	238697	120818	50482	28198	31720	59408	18929	46481	53982	1811583	50460
SMETHWICK	1135193	238897	45815	79036	40467	38237	52717	28101	47215	79203	2109951	68550
STOKE-ON-TRENT	5149259	1019857	388365	278473	217519	168835	445697	118911	131351	528205	9928746	265800
WALSALL	1883441	381296	119489	85992	79220	70613	173985	39543	69684	253366	3740627	118610
WEST BROMWICH	1654587	350881	145782	82707	67750	53357	168932	28739	58644	80043	3189799	95930
WOLVERHAMPTON	2816492	525942	182811	141451	93130	62620	301237	93094	87372	338534	5337052	149780
IPSWICH	1821027	346835	81452	86811	62164	46072	173707	40628	83166	220745	3620684	117230
CROYDON	4355926	954723	218789	231535	226650	122671	508801	64784	108626	165327	8620485	252470
BRIGHTON	2720618	563185	37952	139758	251127	93299	495200	87525	121440	481158	6443898	161690
EASTBOURNE	1010196	254579	40896	70201	91961	29022	112500	36462	44648	189763	2251881	59830
HASTINGS	909186	206192	26452	45789	88477	39346	149847	34259	49015	207799	2293846	66180
BIRMINGHAM	19355468	4306238	844181	1495631	993677	810811	2665466	541692	731720	3360697	43749282	1091500
COVENTRY	6036516	860619	254743	278547	145118	188457	422742	82186	161328	589786	11686444	285700
DUDLEY	1077861	206422	42760	53755	66162	34137	120219	32925	46849	159173	2065670	63600
WORCESTER	1402851	98098	53568	39662	37792	42152	126697	32064	41793	179883	2489035	66550
KINGSTON UPON HULL	5067922	1202817	454498	360513	148403	204823	455321	127798	240227	892784	10861299	300790
MIDDLESBROUGH	2884752	452662	77740	137141	112123	111101	263676	91753	102235	377676	5674877	156490
BARNSLEY	1655279	278894	78351	89892	45438	34296	338020	33567	62228	190692	3372724	74590
BRADFORD	4970679	1439834	580711	254191	152637	224299	500186	214213	139681	790378	10547616	294210
DEWSBURY	909218	182504	59079	36406	52489	29214	149585	33456	51914	123159	1942882	53020
DONCASTER	1844920	440424	151676	81804	83711	56016	274969	40506	60110	204140	3472479	85930
HALIFAX	1635711	348866	95272	120130	87233	57329	351405	80209	92679	258138	3486757	95980
HUDDERSFIELD	2579680	597651	309957	117373	86412	82445	331707	77090	74217	312270	5119161	129910
LEEDS	8276315	804399	437236	664031	322293	372912	1087375	393076	267564	1303737	17362101	511650
ROTHERHAM	1648482	255394	97234	82539	48443	77553	217853	46854	71987	193855	3358393	85440
SHEFFIELD	7535211	1944587	388559	670032	475860	265446	2837317	268523	227859	1117469	21347640	494650
WAKEFIELD	1000551	194563	39988	58272	44924	31973	127494	33337	63714	129782	2142436	60560
YORK	1907000	380492	115793	104081	96217	74026	184977	49538	65311	271512	3814449	104570
CARDIFF	4882738	825425	105710	194551	281754	176792	435412	80267	120943	639921	9708556	256900
MERTHYR TYDFIL	1105008	228762	86897	47689	50767	24561	115463	27604	38819	145088	2173024	58800
SWANSEA	2827769	583998	165617	137567	174629	83405	333977	71839	116013	349419	5742292	167390
NEWPORT	1913241	324680	34712	66722	70855	64069	211269	28640	89938	280858	3988675	107780

TOTAL EXPENDITURES FOR YEAR 1961

METRO BOROUGHS OF LONDON 1961

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
BATTERSEA	0	312877	10967	118114	10340	0	162853	38129	0	0	1986050	104980
BERMONDSEY	0	259802	13280	78511	43948	0	198825	31827	0	0	1678009	51770
BETHNAL GREEN	0	211351	4362	65501	11777	0	94098	20436	0	0	1100285	46490
CAMBERWELL	0	507695	92351	198009	75226	0	302647	54692	0	0	3524536	173980
CHELSEA	0	170627	17049	74217	14099	0	116817	43369	0	0	1886492	48490
DEPTFORD	0	213203	11557	68157	29984	0	152670	21653	0	0	1190858	68220
FINSBURY	0	314936	29069	57576	55719	0	109266	20287	0	0	2522600	33020
FULHAM	0	379033	11743	151733	67168	0	141558	33572	0	0	2336053	111500
GREENWICH	0	256903	21476	92155	27383	0	115136	37972	0	0	1894405	85585
HACKNEY	0	519214	72304	179482	49723	0	296339	42413	0	0	3306002	163180
HAMMERSMITH	0	320207	12051	117094	45448	0	135135	58560	0	0	2327888	108010
HAMPSTEAD	0	293449	50313	124561	7395	0	212381	36277	0	0	2170926	96990
HOLBORN	0	150641	4065	55162	13640	0	150256	35873	0	0	3306761	20520
ISLINGTON	0	634319	25876	313095	69457	0	284087	94161	0	0	3581768	227170
KENSINGTON	0	446961	29841	255337	24056	0	311145	72700	0	0	4456677	169080
LAMBETH	0	452353	44887	227104	29355	0	362453	67882	0	0	4387335	221960
LEWISHAM	0	506533	42050	213766	68848	0	256946	78495	0	0	3604183	220910
PADDINGTON	0	389444	25294	163662	36325	0	213378	61301	0	0	2660956	113980
POPLAR	0	312244	24437	87092	29057	0	218392	57556	0	0	1634357	65850
ST. MARYLEBONE	0	418355	15660	206822	16186	0	445143	41458	0	0	5643228	67690
ST. PANCRAS	0	413859	21134	171437	44603	0	265007	83305	0	0	3715195	125340
SHOREDITCH	0	167248	3697	65166	29285	0	137589	26287	0	0	1527322	40530
SOUTHWARK	0	363317	6774	167117	42609	0	216791	45667	0	0	2204109	86270
STEPNEY	0	470139	67620	157775	40959	0	283206	65081	0	0	2685612	91710
STOKE NEWINGTON	0	157376	5890	60805	1703	0	49132	15880	0	0	938868	52180
WANDSWORTH	0	717037	66053	324405	69400	0	428704	150855	0	0	5399912	346790
WESTMINSTER	0	802633	87278	384027	46932	0	756550	164098	0	0	17527172	86680
WOOLWICH	0	506500	22259	178197	80439	0	209608	83246	0	0	3288379	146850

TOTAL EXPENDITURES FOR YEAR 1961

SCOTLAND 1961

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
ABERDEEN	3517770	0	0	0	0	160952	216550	133193	108637	441137	7863711	185222
ARBROATH	267689	0	0	0	0	2788	35714	14794	12028	19342	571963	19535
DUNDEE	3002218	0	0	0	0	59828	692129	186936	104843	455045	6135019	182854
AYR	604075	0	0	0	0	0	44879	49327	17169	123663	1236625	44601
KILMARNOCK	602203	0	0	0	0	28102	74484	36605	16664	118860	1575618	47575
DUMFRIES	385145	0	0	0	0	9772	56451	17688	10032	23543	822065	26868
CLYDEBANK	724953	0	0	0	0	14256	107081	43138	26577	55999	1743048	50102
DUMBARTON	398428	0	0	0	0	13872	42562	20603	11806	28720	841158	26306
DUNFERMLINE	692687	0	0	0	0	28679	82048	34347	20744	47016	1499056	48045
KIRKCALDY	785793	0	0	0	0	22809	50200	55817	23734	48119	1692611	52644
INVERNESS	423381	0	0	0	0	7446	78783	31687	36553	68146	933316	29469
GLASGOW	18999340	0	0	0	0	534687	1903378	1275772	820863	3918672	46286926	1056008
AIRDRIE	509120	0	0	0	0	9468	37961	19369	15334	66183	1141767	33758
COATBRIDGE	839210	0	0	0	0	12130	72008	27936	25241	121375	1816141	54262
HAMILTON	632803	0	0	0	0	22069	79873	37654	19824	104109	1408492	42192
MOTHERWELL AND WISHAW	1100353	0	0	0	0	10041	79897	64036	0	157488	2255960	73192
RUTHERGLEN	364346	0	0	0	0	2687	43856	21152	11513	22781	833193	25275
EDINBURGH	6453073	0	0	0	0	221438	1015341	429942	229176	1552740	13912551	474062
PERTH	550357	0	0	0	0	15928	64825	43108	24274	100620	1288734	40893
GREENOCK	951229	0	0	0	0	35127	128182	63308	50331	229504	2354609	74634
PAISLEY	1154861	0	0	0	0	26085	131332	73473	61724	236344	2971679	96231
PORT GLASGOW	293000	0	0	0	0	8294	36442	17598	15312	23382	651651	22601
FALKIRK	508327	0	0	0	0	16206	74610	26554	16488	32062	1180214	37803
STIRLING	372290	0	0	0	0	16439	38614	14608	11866	27801	835835	27627

TOTAL EXPENDITURES FOR YEAR 1962

ENGLAND AND WALES 1962

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
READING	2436007	534716	215048	106766	91366	70654	283706	65460	74572	328716	5177154	121420
BIRKENHEAD	2555073	430588	64094	134407	118481	55698	219546	76259	125491	557839	5000710	142940
CHESTER	1174130	230896	64315	65376	45708	36843	145064	27161	52334	70053	2232385	59030
STOCKPORT	2508785	497058	104040	150028	153890	76629	202041	65782	80070	362200	4721610	142570
WALLASEY	1727861	378536	22458	89762	99451	51503	106510	45776	84537	282068	3559442	103490
CARLISLE	1409108	240336	56571	79470	45661	30312	100555	46309	53126	171684	2530858	70800
DERBY	2518936	870792	438187	127483	183890	74988	298185	59331	109902	361040	5644401	131910
EXETER	1356653	274226	92473	60119	54646	38654	251873	41462	62770	236251	3448474	78950
PLYMOUTH	3363397	570971	126732	159249	182494	144739	516410	98122	157561	591572	7215839	209900
DARLINGTON	1501178	285885	93679	86760	38977	43595	102225	43663	50288	104286	2894172	84400
GATESHEAD	1920935	320712	57295	110917	88164	60410	183714	72076	63397	256619	5100396	103120
SOUTH SHIELDS	1908079	342277	26160	101226	138685	67330	206765	62365	87022	248473	3961165	109300
SUNDERLAND	3867558	485486	60865	184953	120421	146082	350567	81935	107755	376207	6765033	190580
WEST HARTLEPOOL	1346295	173271	13400	54433	66143	68193	99210	33834	58363	90796	2528925	78220
EAST HAM	2139545	425347	120296	128659	68894	61677	158678	27585	89573	0	3976310	105430
SOUTHEND-ON-SEA	2769288	378696	186836	176588	246729	80264	633906	61737	92956	548473	7351182	166130
WEST HAM	3078012	584009	172286	156589	67727	108015	413205	47808	202164	0	7059236	156960
BRISTOL	8083432	1385651	443322	353668	266846	257018	882417	169612	314167	1421026	16015261	434260
GLOUCESTER	1695590	287043	112706	53787	42847	31721	174849	31412	69353	107588	3005958	70180
BOURNEMOUTH	2248585	672826	96618	164615	287906	78316	376475	91576	121395	427135	5651630	149830
PORTSMOUTH	4047753	734056	203547	194910	166305	111898	418101	70732	148956	681824	8301879	226670
SOUTHAMPTON	4200307	733078	171273	182720	192441	128280	396141	82724	162992	626607	8497928	205790
CANTERBURY	862230	86391	19735	27248	23151	15851	90827	11713	24378	45566	1497686	30720
BARROW-IN-FURNESS	1126899	253550	42183	70988	41019	43619	145199	36502	62419	202916	3161206	64890
BLACKBURN	1994619	336539	65230	133333	66286	62997	254022	59931	63594	276639	3992399	105740
BLACKPOOL	2230931	747125	119619	227606	174249	47931	416908	112909	113857	465149	5509954	151250
BOLTON	3269190	693113	191532	158145	166252	96871	374809	122610	103734	430554	6508669	160650
BOOTLE	1537126	254688	58964	59998	68304	36072	95152	37394	108263	219872	3131028	83220
BURNLEY	1619591	376064	97337	86015	99746	40433	226505	50946	68754	275669	3609997	80540
BURY	926102	212068	55496	70429	42933	21101	115875	34424	60891	80995	1993548	61120
LIVERPOOL	14230989	2968277	456811	951396	633439	582362	1703768	691069	760955	3756851	32786182	745230
MANCHESTER	13580424	3301035	730215	1021717	663931	583318	1713523	502607	439502	2702695	28851447	659170
OLDHAM	2135846	422117	76091	115208	98132	99290	247855	106819	107559	327041	4544549	114680
PRESTON	2317486	455605	112459	114306	80686	61079	144775	52028	87175	334709	7561638	112130
ROCHDALE	1592840	325344	74612	101289	66738	45671	235548	75364	71168	267695	3551716	86130
ST. HELENS	2034343	528969	226255	119135	122462	41886	178887	60195	117167	300123	4334880	108260
SALFORD	2985981	757482	157370	206940	159844	138851	296297	87430	133167	603845	6398031	154000
SOUTHPORT	1130350	413460	92288	90287	137857	15825	182315	60315	60323	268727	2865551	80730
WARRINGTON	1447539	367580	110997	104714	70556	61888	105615	45506	62199	228091	3172176	76200
WIGAN	1503866	387961	119988	91429	96753	54608	150796	38382	67917	233102	3504444	78910
LEICESTER	5996886	1192488	391035	247125	330074	288506	546463	110850	155033	692408	11745573	272500
GRIMSBY	1808684	305244	87899	115186	41169	69388	148644	37369	68369	306047	3654149	96780
LINCOLN	1281915	200027	53866	68069	58278	40894	134815	35492	71395	204992	2785201	76930
GREAT YARMOUTH	1117412	260932	27793	35510	97589	21284	100990	35450	57245	162120	2549959	52450
NORWICH	2226839	598663	308293	92364	100345	75334	325837	61606	76169	323919	4710464	119760
NORTHAMPTON	1695938	439466	140756	119068	97314	49666	221026	48913	71270	279179	3756881	104910
NEWCASTLE UPON TYNE	4922321	744310	60801	240830	145301	163638	726603	186566	204823	835497	10096264	267090

TOTAL EXPENDITURES FOR YEAR 1962

ENGLAND AND WALES 1962

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
TYNEMOUTH	1076391	189700	19440	59375	58035	38443	110743	41982	71018	183529	2191883	71390
NOTTINGHAM	6272747	1383961	494008	279646	351002	173240	560129	151745	172955	991952	12363228	314360
OXFORD	2115082	461601	187168	94162	89278	89871	222288	56504	84911	331113	4813040	106560
BATH	2033780	269389	53582	91376	58274	43819	225302	38907	64546	210165	3694672	82170
BURTON UPON TRENT	1087703	253890	123688	57336	31810	66161	70790	20477	48629	55155	1975808	50610
SMETHWICK	1233327	263192	43889	84259	48963	44845	71164	33183	51142	98583	2339512	68680
STOKE-ON-TRENT	5589927	1081630	399638	296462	241731	177140	482801	122021	132646	576577	10656933	266130
WALSALL	2033255	425574	116929	92247	84575	77522	202912	42754	85791	278498	4101830	119700
WEST BROMWICH	1855474	393380	158625	91849	73655	58113	187423	27138	62065	96024	3526043	97050
WOLVERHAMPTON	3148853	553268	173960	148592	107159	67404	325495	66370	89999	377280	5764567	149710
IPSWICH	2063453	369172	92518	92012	61459	54304	195163	32855	89330	248384	4005037	118410
CROYDON	4780446	1050011	232962	255389	255801	129980	589841	122015	198982	0	9570586	253690
BRIGHTON	3006399	605882	34701	148318	278228	104416	554130	100152	129013	540760	7166490	162200
EASTBOURNE	1105235	270561	40201	75469	101832	28478	125802	34675	49047	210965	2442350	61250
HASTINGS	1009506	234069	31266	53386	96946	42349	153855	40663	52614	224708	2534417	66640
BIRMINGHAM	20516746	4772602	835926	1757111	1103802	869501	3101375	577674	829521	3746412	49715788	1093160
COVENTRY	6518017	1015952	296704	345583	156844	203166	539934	93799	170190	681314	12966209	291000
DUDLEY	1181592	222258	44474	60112	69583	62130	153809	34235	55576	173564	2289423	63820
WORCESTER	1541996	189447	61752	51189	41315	44057	151450	37604	46884	200751	2801016	67050
KINGSTON UPON HULL	5761359	1321431	506009	370946	170910	221090	479782	126733	260769	985498	11916638	301640
MIDDLESBROUGH	3210152	528206	115243	157191	125109	127404	338001	102525	106272	436709	6253746	157690
BARNSLEY	1797381	339489	116890	99706	50110	33525	373164	36144	68548	220609	3742668	74910
BRADFORD	5672436	1460638	763454	299192	160185	239093	590128	220136	161612	868408	11332994	296220
DEWSBURY	1010235	193292	57182	40197	55911	31821	157692	36912	59423	138012	2130934	53520
DONCASTER	2077023	463889	152942	87079	90422	61665	313442	46642	63148	222410	4392151	86460
HALIFAX	1736668	377611	102140	129241	94422	59851	381533	81811	97573	283951	3868789	96250
HUDDERSFIELD	2814286	683166	363445	132510	94878	80899	322457	79319	86926	346478	5608614	131050
LEEDS	9203937	1949705	468071	720178	349738	407148	1225319	405531	285372	1402423	19367079	514640
ROTHERHAM	1821581	328401	111801	89412	50548	87326	218026	51858	79037	223340	3728399	86220
SHEFFIELD	8242741	2305007	437138	723691	564864	331673	3098580	289107	240446	1231746	23683027	495240
WAKEFIELD	1080653	205553	44074	59908	47743	32742	149072	38557	58287	146038	2323086	60560
YORK	2070873	398357	121619	103208	97830	76157	207729	50449	68420	301223	4090391	104890
CARDIFF	5530911	886399	116169	194420	312725	183975	479660	101533	128469	697171	10842278	260160
MERTHYR TYDFIL	1178617	184956	33329	48446	57094	27550	136723	26402	44333	161334	2339919	58940
SWANSEA	3101148	632066	165460	154455	193485	97227	358116	80259	120289	400294	6287953	169180
NEWPORT	2060180	380067	41057	80095	96126	70050	244401	37432	100962	317737	4429359	108550

TOTAL EXPENDITURES FOR YEAR 1962

METRO BOROUGHS OF LONDON 1962

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
BATTERSEA	0	323838	10282	118293	11259	0	180322	40879	0	0	2173949	104020
BERMONDSEY	0	303350	14436	88090	54846	0	206255	34409	0	0	1902643	51000
BETHNAL GREEN	0	241781	5687	70096	12017	0	103911	20539	0	0	1216051	46230
CAMBERWELL	0	500650	44642	214569	81612	0	323079	47221	0	0	3771803	173720
CHELSEA	0	184167	12447	76653	18728	0	134790	42798	0	0	1931890	48550
DEPTFORD	0	246067	13925	72324	39157	0	169231	22292	0	0	1290416	68980
FINSBURY	0	361180	38110	63972	61158	0	140767	20299	0	0	2768628	32540
FULHAM	0	413876	10252	158621	84764	0	160475	38849	0	0	2526711	110570
GREENWICH	0	277214	18972	95546	31807	0	133089	48787	0	0	2009454	84730
HACKNEY	0	534182	80462	191186	41220	0	328314	43514	0	0	3526616	163400
HAMMERSMITH	0	374750	16632	128914	47621	0	161835	55873	0	0	2530176	108120
HAMPSTEAD	0	327329	63223	138465	7151	0	253810	42595	0	0	2393284	98240
HOLBORN	0	197345	3954	60775	23029	0	192708	36170	0	0	3530131	20640
ISLINGTON	0	679488	31270	336567	84460	0	300963	97582	0	0	3834046	227870
KENSINGTON	0	461603	28821	253617	25108	0	345882	80971	0	0	5057739	172020
LAMBETH	0	521956	53236	264026	44693	0	417907	72211	0	0	4807250	223370
LEWISHAM	0	568805	36999	223833	75437	0	239622	97775	0	0	3930884	222170
PADDINGTON	0	424660	19926	188055	39619	0	218008	44103	0	0	2830928	113600
POPLAR	0	323812	21316	95623	31009	0	219555	40509	0	0	1719019	67070
ST. MARYLEBONE	0	445274	16958	216695	14337	0	546535	45099	0	0	6414852	68070
ST. PANCRAS	0	462368	24003	185875	47298	0	328002	46191	0	0	4130112	124470
SHOREDITCH	0	188058	12730	67681	33842	0	142887	22107	0	0	1681667	39580
SOUTHWARK	0	398640	11083	183616	46400	0	235389	48270	0	0	2521624	86440
STEPNEY	0	486867	70971	168084	49450	0	320708	56719	0	0	2845745	90480
STOKE NEWINGTON	0	164122	4217	61415	52808	0	55374	15242	0	0	993288	52950
WANDSWORTH	0	839527	80324	374772	88598	0	479954	135785	0	0	5908317	347810
WESTMINSTER	0	881491	56608	429328	36006	0	892875	187507	0	0	18955540	86110
WOOLWICH	0	608397	24682	200448	94813	0	282044	88818	0	0	3790305	148140

TOTAL EXPENDITURES FOR YEAR 1962

SCOTLAND 1962

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
ABERDEEN	3928804	0	0	0	0	176589	274149	141874	114432	458855	8751670	185678
FRASERBURGH	191960	0	0	0	0	0	33106	3638	4653	10425	337127	10418
PETERHEAD	236394	0	0	0	0	0	46403	5485	5730	12716	441353	12698
ARBROATH	290889	0	0	0	0	2615	35806	15928	11882	27115	646697	19679
DUNDEE	3334084	0	0	0	0	62796	669785	194291	114583	503702	6641895	183560
FORFAR	141098	0	0	0	0	0	20776	6559	6114	14106	328746	10319
MONTROSE	152656	0	0	0	0	0	29342	6106	6555	15025	318723	10834
DUNOON	159512	0	0	0	0	0	57954	5736	0	16652	381316	9437
AYR	647939	0	0	0	0	0	64799	46809	17905	138964	1394403	44941
IRVINE	243917	0	0	0	0	0	20663	6807	6810	15600	555498	17731
KILMARNOCK	683033	0	0	0	0	28880	86416	39929	18698	135743	1845932	48027
PRESTWICK	173612	0	0	0	0	0	24991	11239	4867	11035	345364	12467
SALTCOATS	216877	0	0	0	0	0	19017	6530	6059	13874	437236	14113
TROON	141882	0	0	0	0	0	10570	9022	3961	9185	291778	9741
BUCKIE	138491	0	0	0	0	0	20055	3077	0	7613	256806	7688
ROTHESAY	120672	0	0	0	0	0	19622	5253	4995	8648	302458	7370
ALLOA	262403	0	0	0	0	0	20408	11059	0	16194	497196	13902
DUMFRIES	421531	0	0	0	0	11461	65174	20117	10950	27846	941804	27042
BEARSDEN	294239	0	0	0	0	0	37966	17262	0	23729	592270	18456
CLYDEBANK	820088	0	0	0	0	16444	113055	47573	29375	67114	1923761	50369
DUMBARTON	443329	0	0	0	0	14857	58361	21079	13821	35037	954275	26461
HELENSBURGH	151993	0	0	0	0	0	23790	13680	0	12479	313996	9795
KIRKINTILLOCH	282750	0	0	0	0	0	35967	16403	0	23657	551303	18743
BUCKHAVEN AND METHIL	365539	0	0	0	0	0	11308	9332	0	0	640166	21147
COWDENBEATH	219656	0	0	0	0	0	7654	6341	0	0	404016	11872
DUNFERMLINE	831086	0	0	0	0	28112	74075	35884	20092	62413	1671282	48863
KIRKCALDY	911953	0	0	0	0	25395	52481	63720	22270	63756	1980948	52697
LOCHGELLY	0	0	0	0	0	0	0	0	0	0	0	9108
ST. ANDREWS	227204	0	0	0	0	0	16411	6201	0	0	369865	10149
INVERNESS	483249	0	0	0	0	7749	82610	35280	23958	74547	1032166	29603
GLASGOW	21029188	0	0	0	0	569646	2020038	1314997	899600	4227953	50124642	1049115
AIRDRIE	570512	0	0	0	0	10477	42708	18810	16747	79543	1262961	33950
COATBRIDGE	940588	0	0	0	0	13305	81687	31162	27684	138914	2052398	54594
HAMILTON	706336	0	0	0	0	19186	86564	30106	23187	112749	1543528	42679
MOTHERWELL AND WISHAW	1222822	0	0	0	0	11750	83250	68239	0	176202	2550297	73483
RUTHERGLEN	407996	0	0	0	0	4525	50807	24783	11686	29094	919977	25518
EDINBURGH	7041865	0	0	0	0	234834	1080084	451441	230164	1659579	15214079	475338
MUSSELBURGH	319965	0	0	0	0	0	27027	10014	8154	20751	577406	17592
ELGIN	172250	0	0	0	0	0	37511	12764	4530	11228	382374	12198
PERTH	640201	0	0	0	0	18013	83945	44242	25733	121766	1497811	40940
BARRHEAD	181883	0	0	0	0	0	16336	10895	9221	16033	398663	14959
GOUROCK	113145	0	0	0	0	0	19320	9153	5748	9976	273321	9875
GREENOCK	957016	0	0	0	0	36968	130002	67832	53085	241160	2475343	74607
JOHNSTONE	227938	0	0	0	0	0	24360	9028	11544	19948	563312	19254
PAISLEY	1215424	0	0	0	0	32000	135696	81140	66816	256401	3216259	96670
PORT GLASGOW	308007	0	0	0	0	8959	40364	17856	16519	26901	705989	22633
RENFREW	477502	0	0	0	0	0	55285	50348	24080	41205	907084	18064

TOTAL EXPENDITURES FOR YEAR 1962

SCOTLAND 1962

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
HAWICK	244490	0	0	0	0	0	48376	7370	0	18718	529045	15984
GALASHIELS	186000	0	0	0	0	0	43497	8788	4674	13100	406645	12262
FALKIRK	547104	0	0	0	0	17747	81166	28611	18767	41379	1334265	37916
GRANGEMOUTH	661240	0	0	0	0	0	75222	16661	18958	46493	1233075	19249
KILSYTH	0	0	0	0	0	0	0	0	0	0	0	9779
STIRLING	401637	0	0	0	0	14661	37681	16832	13337	30171	876587	27599
BATHGATE	194181	0	0	0	0	0	28442	5727	5580	13757	416527	12967
BO NESS	159756	0	0	0	0	0	20146	5378	4591	11258	310405	10246

TOTAL EXPENDITURES FOR YEAR 1963

ENGLAND AND WALES 1963

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
READING	2651343	510055	238748	122054	95296	70064	300768	70995	88445	354005	5606619	121450
BIRKENHEAD	2867712	376751	137173	48496	120443	57650	252844	77953	147739	586817	5460515	143680
CHESTER	1316217	247634	71602	70222	43182	39556	166784	28403	63367	72528	2473852	59370
STOCKPORT	2823548	542100	107326	157938	162968	90804	227606	70679	91161	384495	5260517	142740
WALLASEY	1956179	403012	24200	94721	102098	51814	114661	43140	93621	300975	3891579	103370
CARLISLE	1579115	244760	61037	70347	51300	33483	121084	43069	62824	191288	2794306	70950
DERBY	2771318	855887	387428	134491	203766	85037	316491	72641	136091	395151	6113589	131630
EXETER	1505128	321794	108754	66177	68476	47469	317486	45023	70113	259547	3874394	79690
PLYMOUTH	3868397	607009	131043	176222	198095	170348	682725	110485	165788	627078	8251504	210090
DARLINGTON	1681959	292761	99495	78981	45751	47349	107507	46657	52942	116389	3084152	84210
GATESHEAD	2213749	307757	44085	119647	75547	58393	238566	67464	74377	277143	4476189	102560
SOUTH SHIELDS	2103804	360507	34480	107329	140794	74980	214003	54263	103496	271359	4247587	109080
SUNDERLAND	4491620	528306	70393	209263	133867	155152	389813	88400	125678	405666	7758801	190510
WEST HARTLEPOOL	1517235	178921	13655	54543	68972	73950	101255	34995	65995	108637	2756080	78600
EAST HAM	2341198	421583	111469	123968	72483	68119	190106	30829	100948	0	4282232	105190
SOUTHEND-ON-SEA	3126367	751625	178394	182497	261223	86935	712298	70361	110252	632987	8266637	165910
WEST HAM	3401611	547337	110725	153442	82501	117967	382753	55301	203916	0	7263380	157120
BRISTOL	8621544	1523519	501863	372438	294529	415155	1113900	186284	368475	1538547	17671495	433920
GLOUCESTER	1919258	320439	130196	57257	48443	33968	207775	33967	82771	119629	3400965	70820
BOURNEMOUTH	2728561	791084	122371	197648	312113	87590	451571	95330	139442	452909	6535278	150690
PORTSMOUTH	4681555	739187	207081	188860	181580	123239	460489	75552	177849	714703	9324217	224900
SOUTHAMPTON	4705166	842932	187754	204976	199216	145272	478238	92030	182843	647835	9411187	207220
CANTERBURY	944208	91612	19043	27694	26030	16435	98265	12734	27390	40598	1647330	31030
BARROW-IN-FURNESS	1253360	255520	45995	67966	43001	50979	154301	37000	66999	212564	3434714	65710
BLACKBURN	2213664	394287	88823	137319	65679	66380	245409	65771	72046	302340	4402562	104990
BLACKPOOL	2540742	790901	141177	224179	196675	52698	423608	123732	132462	492423	6102296	151000
BOLTON	3678570	813831	242770	163325	185038	105632	413174	127863	126291	456595	7230713	159780
BOOTLE	1762902	266729	57852	65446	73016	33873	124589	36853	126104	235757	3554380	83330
BURNLEY	1782369	382244	94844	86896	100547	40415	290882	49523	78003	288665	3876910	80200
BURY	1047369	231390	69314	73896	42719	24132	121807	38362	66160	83211	2207887	61740
LIVERPOOL	15822395	3161951	448573	975209	653434	628389	2534799	727154	901345	3971659	36209577	739740
MANCHESTER	15187040	3488941	787585	1103604	338919	676719	1838313	491019	511645	2973733	31683347	654670
OLDHAM	2428380	454503	85619	121350	107497	106291	240842	117121	122585	359114	5120851	114220
PRESTON	2654001	478940	115586	106214	86087	71569	156964	53981	107989	352229	5032260	111670
ROCHDALE	1769182	339215	77686	104584	67541	49960	246222	72083	86229	281848	3920213	86300
ST. HELENS	2266180	563772	233035	124757	138826	45929	204269	68804	141289	323871	4758558	107480
SALFORD	3297937	814961	167831	230883	155680	149988	293054	91416	148554	619616	7061694	152570
SOUTHPORT	1252549	412950	94201	93855	128486	16885	199370	60169	66749	281740	3083483	80160
WARRINGTON	1604308	380252	108961	106334	78268	63808	114998	48695	81266	232692	3429340	75780
WIGAN	1684828	413597	132652	95178	104059	46051	158563	37778	86215	245353	3772614	78780
LEICESTER	6778553	1261214	444470	247079	340998	294165	618371	121197	172937	734300	13019896	279390
GRIMSBY	2037826	356867	109165	115439	46383	80446	171091	39387	76414	325224	4082901	96350
LINCOLN	1468046	200833	56652	71519	52121	45109	155806	32934	69232	214233	3055535	77440
GREAT YARMOUTH	1213559	287401	31056	45136	103483	24811	122732	35798	71636	177577	2789903	52670
NORWICH	2442383	628218	328484	96618	104248	78426	334242	68317	85817	346488	5064852	119450
NORTHAMPTON	1927862	446827	147778	111041	103008	54462	241028	49132	81671	294609	4086347	105420
NEWCASTLE UPON TYNE	5660158	793578	54258	252301	160909	167345	854820	201507	234233	889995	11442428	263360

TOTAL EXPENDITURES FOR YEAR 1963

ENGLAND AND WALES 1963

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
TYNEMOUTH	1249514	175607	19205	63864	50441	46893	125955	43673	72678	189388	2434126	71910
NOTTINGHAM	6834058	1432214	486729	308742	368796	177902	543970	142885	203433	1025435	13840350	315050
OXFORD	2416606	471801	191427	98251	87150	98538	301811	62151	98823	353914	5439555	107110
BATH	2285632	286027	58620	100332	58841	42996	207400	39257	75742	225099	4051254	82570
BURTON UPON TRENT	1235733	268820	133784	60126	31835	34511	85165	21609	53752	62186	2186762	50590
SMETHWICK	1322414	298574	47660	85183	66840	45726	91424	32720	60720	97984	2559599	68510
STOKE-ON-TRENT	6134574	1111684	414920	298137	246771	191703	485776	134172	154046	618024	11385528	266110
WALSALL	2300239	468790	119570	106999	93908	81381	217470	45684	95647	304516	4514611	120590
WEST BROMWICH	2082290	432071	164765	91579	80377	61257	168342	32654	73752	88259	3790193	97710
WOLVERHAMPTON	3508484	585886	181531	153595	114828	80083	357439	56789	110972	414579	6323715	150280
IPSWICH	2357647	438618	108338	111466	85795	58225	225953	34807	100206	268469	4474395	119440
CROYDON	5269589	1097707	248282	251405	273899	136601	705901	137548	225301	0	10534493	254130
BRIGHTON	3462807	643768	33755	162643	296974	116555	672988	102693	145971	578986	8127116	162910
EASTBOURNE	1256416	286143	51643	78544	99909	29791	164997	39095	56199	218700	2776858	62010
HASTINGS	1126202	223881	33812	57076	90606	45873	201687	39590	58786	236788	2788239	66640
BIRMINGHAM	22360140	5039668	881428	1873034	1098278	936245	3467670	640359	985014	4003864	54919721	1115080
COVENTRY	7379997	115099	344943	325557	165974	222862	672164	103031	196781	754183	14527340	305780
DUDLEY	1354914	268052	64620	65536	72081	50405	179707	37324	63002	181251	2583892	64110
WORCESTER	1793949	184611	63965	47956	39539	51084	165022	41671	52418	214907	3154868	67320
KINGSTON UPON HULL	6552207	397859	525711	381345	183849	248083	529925	142124	317643	1051348	13152569	301000
MIDDLESBROUGH	3664427	545228	109627	167489	129171	140693	315373	110583	129663	483480	6837213	158110
BARNSLEY	2004419	350375	118980	100046	52097	35180	384179	37074	76390	228467	4031941	75000
BRADFORD	5520835	1411242	620977	346031	175681	261678	669461	216554	217485	927389	11814241	297040
DEWSBURY	1136365	216958	63500	40889	62665	34144	171636	38110	72569	148752	2394980	53790
DONCASTER	2315867	461788	162540	82388	98372	65980	344057	52167	74646	230328	4846484	86910
HALIFAX	2002380	419388	125347	136851	102320	59791	427112	83903	116300	296653	4315198	95850
HUDDERSFIELD	3210224	626748	377188	38375	106012	84370	374682	83825	95702	355815	6187567	131840
LEEDS	9939781	2099955	472702	782707	385295	444348	1323978	418320	338331	1506806	20153412	513800
ROTHERHAM	2018579	332588	119465	96903	53668	90384	248884	58831	102977	227243	4049287	86660
SHEFFIELD	9169538	2414838	520093	667242	551433	364335	2975666	286667	274578	1314174	25615324	495290
WAKEFIELD	1244124	220634	45683	64057	52869	35540	184238	40444	64609	152302	2644130	69430
YORK	2338435	439844	134918	120391	97891	80116	236688	54894	77889	311263	4513074	104250
CARDIFF	5672157	963764	114961	221447	357511	207750	669581	124815	158144	762683	11640028	260640
MERTHYR TYDFIL	1326530	180771	32909	51058	52115	28979	152500	27115	59148	168697	2555202	58700
SWANSEA	3425463	634342	148211	160251	205504	97863	443455	80576	137760	411404	6810483	170390
NEWPORT	2233734	383999	58555	77809	85348	76018	333496	38206	109803	331522	5069544	108780

TOTAL EXPENDITURES FOR YEAR 1963

METRO BOROUGHS OF LONDON 1963

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
BATTERSEA	0	347279	8452	134160	11558	0	230982	48548	0	0	2454767	102940
BERMONDSEY	0	324684	14483	87795	56789	0	234087	37965	0	0	2129883	50540
BETHNAL GREEN	0	266862	12544	74188	12967	0	111110	21511	0	0	1346373	46090
CAMBERWELL	0	532733	44506	228038	97831	0	360891	10025	0	0	4303770	174220
CHELSEA	0	204425	21826	81145	18460	0	156122	37292	0	0	2093322	48050
DEPTFORD	0	264401	17971	74314	34036	0	190469	23187	0	0	1410028	68450
FINSBURY	0	397755	39566	70872	71080	0	167875	25057	0	0	3097204	32230
FULHAM	0	443255	10954	174875	94008	0	171660	43900	0	0	2785168	109700
GREENWICH	0	288584	17638	90669	33790	0	165428	48995	0	0	2286068	83760
HACKNEY	0	563830	82784	202985	47802	0	364637	53960	0	0	3756009	163170
HAMMERSMITH	0	385248	17497	134821	41812	0	187148	74280	0	0	2798498	107660
HAMPSTEAD	0	330582	48032	144484	9115	0	242433	47418	0	0	2624268	97980
HOLBORN	0	222038	4154	64338	30447	0	254117	38010	0	0	3990721	20700
ISLINGTON	0	707642	37241	349048	87617	0	276759	105734	0	0	4079574	227410
KENSINGTON	0	495457	25612	285925	24734	0	414195	85097	0	0	5421360	172170
LAMBETH	0	582918	41975	297745	35956	0	446004	77662	0	0	5429657	223120
LEWISHAM	0	630328	43105	253252	83841	0	326992	85354	0	0	4591369	222730
PADDINGTON	0	447522	21623	200456	40783	0	274466	33284	0	0	3142700	113960
POPLAR	0	342014	24908	101563	32827	0	238078	47972	0	0	1864096	67830
ST. MARYLEBONE	0	483262	19881	235386	17893	0	664242	53463	0	0	7301487	67320
ST. PANCRAS	0	487764	18121	198150	50299	0	339122	37461	0	0	4611527	123610
SHOREDITCH	0	215053	24925	69926	34032	0	169591	27813	0	0	1710058	38330
SOUTHWARK	0	420754	12415	192957	51956	0	230068	48970	0	0	2775011	85870
STEPNEY	0	486466	48139	175903	46223	0	334026	67736	0	0	3046138	89930
STOKE NEWINGTON	0	169241	2999	62348	2903	0	61873	16487	0	0	1057855	52830
WANDSWORTH	0	908313	92817	415636	84739	0	426603	142398	0	0	6594113	348450
WESTMINSTER	0	955734	63637	494264	43061	0	1074299	198001	0	0	21917033	86550
WOOLWICH	0	634797	25648	207398	105576	0	319662	113337	0	0	4177571	148690

TOTAL EXPENDITURES FOR YEAR 1963

SCOTLAND 1963

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
ABERDEEN	4170580	0	0	0	0	186184	269155	140106	140409	490662	9118305	185953
FRASERBURGH	202842	0	0	0	0	0	33187	5421	5841	10640	358425	10492
PETERHEAD	241291	0	0	0	0	0	50280	5928	6948	12518	435089	12798
ARBROATH	279503	0	0	0	0	2024	44909	17194	13938	23329	675522	19726
DUNDEE	3578932	0	0	0	0	75794	662176	204385	131674	547563	7101649	184119
FORFAR	151685	0	0	0	0	0	22603	6559	7395	12862	338288	10263
MONTROSE	161386	0	0	0	0	0	28220	6341	7868	13507	340542	10915
DUNOON	197602	0	0	0	0	0	73236	10324	6421	19919	444673	9411
AYR	698009	0	0	0	0	0	84621	50069	25538	146703	1573460	45231
IRVINE	268760	0	0	0	0	0	22309	6677	9800	16988	623303	18430
KILMARNOCK	761345	0	0	0	0	30491	88574	42418	28390	139753	1984423	48057
PRESTWICK	190676	0	0	0	0	0	25681	14153	6953	11969	390921	12557
SALTCOATS	223730	0	0	0	0	0	18716	7116	8158	14171	427300	14284
TROON	0	0	0	0	0	0	0	0	0	0	0	9859
BUCKIE	149304	0	0	0	0	0	23664	5179	0	7500	265521	7647
ROTHESAY	132686	0	0	0	0	0	20482	5541	6056	9004	318804	7254
ALLOA	272534	0	0	0	0	0	17657	13523	0	16262	495319	14900
DUMFRIES	445632	0	0	0	0	14818	72805	23468	15283	26357	1026038	27311
BEARSDEN	329018	0	0	0	0	0	39165	15957	0	24115	603077	19345
CLYDEBANK	855850	0	0	0	0	24433	128226	54430	26384	61432	1901151	50181
DUMBARTON	440320	0	0	0	0	18013	75098	21375	15240	32355	1028102	26416
HELENSBURGH	176110	0	0	0	0	0	27298	13848	0	12712	353499	9827
KIRKINTILLOCH	349581	0	0	0	0	0	36242	17551	0	25655	730013	18993
BUCKHAVEN AND METHIL	384627	0	0	0	0	0	0	11039	0	0	677669	20910
COWDENBEATH	192703	0	0	0	0	0	0	8485	0	0	365996	11572
DUNFERMLINE	927196	0	0	0	0	27842	94177	38195	29126	62146	1799728	49870
KIRKCALDY	1005451	0	0	0	0	28860	56026	65185	31185	62450	1978592	52638
LOCHGELLY	162733	0	0	0	0	0	0	4720	0	0	304811	8956
ST. ANDREWS	265334	0	0	0	0	0	0	6959	0	0	359684	10083
INVERNESS	529271	0	0	0	0	8173	96615	37183	28846	97601	1132670	30008
GLASGOW	22348934	0	0	0	0	673934	2094552	1367172	1057457	4594811	54232953	1036321
AIRDRIE	579889	0	0	0	0	10095	54208	20828	18410	85754	1299628	34197
COATBRIDGE	949633	0	0	0	0	14789	88363	34206	30040	144059	2119919	54813
HAMILTON	716648	0	0	0	0	21100	107081	35718	24188	119135	1617942	43093
MOTHERWELL AND WISHAW	1238357	0	0	0	0	13309	84086	73059	0	184898	2589185	73756
RUTHERGLEN	425352	0	0	0	0	6335	62476	26837	12642	28771	969992	25714
EDINBURGH	7526280	0	0	0	0	286454	1276437	473942	260046	1841572	16523485	476228
MUSSELBURGH	314443	0	0	0	0	0	23636	11009	9636	20526	536803	17745
ELGIN	182558	0	0	0	0	0	40909	12329	5508	11698	398249	12300
PERTH	646118	0	0	0	0	18172	87681	42386	31908	128204	1557522	41113
BARRHEAD	226627	0	0	0	0	0	19694	11662	10860	19020	468882	15437
GOUROCK	148164	0	0	0	0	0	21016	11589	7112	12496	313533	10055
GREENOCK	1020613	0	0	0	0	40129	142602	73177	52152	264477	2641303	74655
JOHNSTONE	0	0	0	0	0	0	0	0	0	0	0	19529
PAISLEY	1295129	0	0	0	0	33105	150215	92635	66728	269783	3426387	96699
PORT GLASGOW	316227	0	0	0	0	9351	43395	18834	15759	27311	724735	22700
RENFREW	416607	0	0	0	0	0	48447	31863	22650	31219	937112	18149

TOTAL EXPENDITURES FOR YEAR 1963

SCOTLAND 1963

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
HAWICK	260924	0	0	0	0	0	51637	6307	0	19095	585869	15932
GALASHIELS	208984	0	0	0	0	0	51278	9502	5505	14140	458406	12230
FALKIRK	584915	0	0	0	0	19803	90021	28533	21583	39905	1410243	37885
GRANGEMOUTH	702446	0	0	0	0	0	72128	17873	23020	47832	1371847	19698
KILSYTH	0	0	0	0	0	0	0	0	0	0	0	9729
STIRLING	441274	0	0	0	0	13758	58460	19276	15815	31921	979145	27592
BATHGATE	216756	0	0	0	0	0	32426	8417	6693	13610	438434	13299
BO NESS	170070	0	0	0	0	0	22105	5447	5251	10439	310276	13330

TOTAL EXPENDITURES FOR YEAR 1964

ENGLAND AND WALES 1964

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
READING	2855622	621290	238603	139614	103688	80198	349719	73872	89872	377933	6179112	123310
BIRKENHEAD	2910296	467258	71485	145248	128928	68184	241169	84090	159337	623194	5750417	143470
CHESTER	1436825	264303	85190	74959	40563	37502	172856	30637	64095	77241	2633992	59800
STOCKPORT	3087642	539561	99953	165489	180021	100651	245400	70441	100809	409219	5640108	142500
WALLASEY	2142740	455282	22625	100141	109751	54668	125986	45486	94734	320598	4281737	103320
CARLISLE	1702143	267770	68816	75548	53987	36112	143896	42797	70475	211246	3037629	71290
DERBY	2958261	881092	374735	139589	218234	91010	322325	92762	134186	428073	6422158	130030
EXETER	1779254	359988	134264	66540	74494	51302	310284	48820	82110	286999	4280816	81810
PLYMOUTH	4206970	640266	132092	193326	211769	196061	729601	115645	205551	692335	8843237	213800
DARLINGTON	1884613	313120	113310	81848	42551	60421	107597	48603	63809	131921	3494828	84320
GATESHEAD	2400235	310019	44080	134723	65320	55498	231395	72054	94861	297728	4890401	101760
SOUTH SHIELDS	2345836	384507	33279	111531	157355	77863	228875	56166	109304	294210	4677236	108770
SUNDERLAND	5089715	541791	58336	216323	143983	159313	405252	105701	139575	449237	8563659	189630
WEST HARTLEPOOL	1683105	197516	22240	57147	74803	75873	109469	37857	73442	128646	3041199	78360
EAST HAM	2562088	465390	116470	150311	77602	73321	187659	30128	105127	0	4696006	104070
SOUTHEND-ON-SEA	3359059	839000	169872	236366	292167	93959	850942	70951	120408	722763	9071434	165780
WEST HAM	3784612	556601	120355	137028	87682	118687	393727	55704	219955	0	7841198	156120
BRISTOL	9446988	1725115	635125	397281	330056	335751	1026181	194824	430275	1723264	19086186	432070
GLOUCESTER	2072600	382353	177974	60284	53883	42239	225357	36998	85905	135988	3803601	71650
BOURNEMOUTH	2986518	821198	158901	189127	305197	87159	481603	94853	145706	510983	7095643	151090
PORTSMOUTH	5303896	797493	208076	206432	195983	137160	464384	78003	180436	796446	10263839	221470
SOUTHAMPTON	5241447	864527	190039	212827	205124	171400	475799	93938	211499	703360	10293085	208710
CANTERBURY	1060788	98826	19954	30861	27910	15572	98712	13911	25146	51941	1795145	32010
BARROW-IN-FURNESS	1331703	265558	48958	70245	44747	51159	145961	40472	71598	230741	3629162	65180
BLACKBURN	2396057	419192	96709	143522	79321	72466	273957	67440	79222	331915	4857191	103610
BLACKPOOL	2706878	842776	167308	228928	212931	54675	431982	130348	141889	546841	6469179	150030
BOLTON	3955490	888567	288141	170774	201234	114409	472044	143955	135392	494465	7863513	159190
BOOTLE	1904094	283785	59538	71460	75971	40742	122178	38585	128640	252387	3768107	83040
BURNLEY	1877002	401745	94767	93654	108133	43099	273596	47978	81286	305408	4137995	79250
BURY	1184492	254837	84556	82312	47401	25373	135662	38704	75012	84500	2424223	62080
LIVERPOOL	17298032	3597239	517537	1020062	797735	668712	2746494	784581	1022899	4302779	40384769	729140
MANCHESTER	16682331	3617949	872481	1148309	688160	750964	1962492	482603	543632	3215752	34460822	644500
OLDHAM	2607719	464920	78905	128543	117826	119507	242363	122244	129518	376924	5486586	112670
PRESTON	2890357	543094	124850	125527	93678	77281	164292	58344	113998	390971	5458431	110390
ROCHDALE	1961299	347995	64326	107312	86214	54507	252221	74563	95054	302817	4259633	86180
ST. HELENS	2449094	596535	229497	135647	154789	51730	224811	69395	138729	352065	5312979	105310
SALFORD	3532121	853965	166257	230496	175162	150899	327828	90522	157988	659268	7716637	150350
SOUTHPORT	1349768	420790	91184	94052	136405	19651	217592	65561	70969	305053	3318239	80080
WARRINGTON	1718144	386561	105136	116225	81034	71781	129419	48897	94897	247328	3612033	75110
WIGAN	1810702	434334	130439	96720	122592	42454	179258	39221	91963	269218	4003444	77250
LEICESTER	7155970	1299888	464772	248400	333572	315005	682472	134568	198377	797979	13781840	267050
GRIMSBY	2220041	401017	115242	120527	49407	84581	206932	42942	94837	345810	4540351	95300
LINCOLN	1606506	223125	53839	73873	60613	50114	164768	34743	80405	244028	3254117	77180
GREAT YARMOUTH	1308690	299678	32771	50577	104521	25427	129402	41754	73992	194371	3038856	52720
NORWICH	2630120	626240	313627	95263	116892	83017	354955	79772	95436	368587	5390878	119150
NORTHAMPTON	2080693	470953	149186	113960	112949	61486	281155	51178	83707	332086	4403018	106120
NEWCASTLE UPON TYNE	6208053	853952	65618	271413	169701	205539	827421	208518	268795	981031	12725635	260750

TOTAL EXPENDITURES FOR YEAR 1964

ENGLAND AND WALES 1964

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
TYNEMOUTH	1435966	183078	18455	68532	55066	51428	140468	44720	78280	211983	2711677	71890
NOTTINGHAM	7305720	1469659	487594	310631	400898	196935	572833	151531	214880	1122883	13951221	311850
OXFORD	2740458	529897	219034	105857	101574	111368	300431	64529	113131	393299	6009814	108880
BATH	2528929	297779	58727	105522	62726	44500	227485	43898	79079	243773	4427731	82750
BURTON UPON TRENT	1355866	291616	145245	63183	35416	33713	118973	22032	55491	69488	2370586	50540
SMETHWICK	1428246	331217	56799	93947	72896	45052	116926	34824	62471	102367	2782557	67750
STOKE-ON-TRENT	6591084	1125065	398505	285013	278113	192572	543428	155143	170220	686477	12203865	263910
WALSALL	2648759	503491	123214	120999	102466	89063	219724	46635	97303	342768	4997147	119910
WEST BROMWICH	2251821	456904	156262	104193	83819	70802	219279	34107	75467	112633	4169474	97600
WOLVERHAMPTON	3907520	601281	163166	161727	121050	90168	388195	58348	116763	451417	6937174	150200
IPSWICH	2583966	430046	136713	103420	62858	57920	214987	43302	112089	292848	4792403	120120
CROYDON	5630005	170114	237088	298837	277166	154313	728537	157232	247117	0	11438517	253430
BRIGHTON	3988240	694263	30766	181022	317519	123362	725197	109880	147600	674289	9140187	162650
EASTBOURNE	1394427	306523	64737	77707	105535	31290	130016	40484	53658	235505	3275591	63530
HASTINGS	1239085	244702	35596	61297	105255	48493	195181	41310	60531	257808	2997724	66690
BIRMINGHAM	24088326	5430119	990207	1973155	1178801	1048316	3541348	613526	977126	4302389	56950569	1115080
COVENTRY	8130506	1275272	418453	339856	193302	241944	918737	110432	215678	839132	15615428	310640
DUDLEY	1456249	254023	51689	66328	83531	55107	167850	39813	64629	198062	2863067	63890
WORCESTER	1975496	196242	63416	52257	42376	60279	164482	48584	52952	225504	3380870	67580
KINGSTON UPON HULL	7225309	1504136	523888	407585	239615	272991	562895	146592	341304	1116096	14327600	300320
MIDDLESBROUGH	4019669	660238	142990	177963	147786	149460	374955	115873	135173	526607	7685375	157740
BARNSLEY	2130543	365152	123229	104143	53068	34959	404906	39230	79046	256784	4273578	75260
BRADFORD	6303577	1402927	609580	305033	178787	287523	648873	219634	239464	1044838	13191332	298220
DEWSBURY	1246387	228011	71439	47252	47803	40873	171478	40987	83473	162907	2625310	53490
DONCASTER	2567552	471138	149123	88136	113697	72588	378970	50254	78609	246356	5223058	87100
HALIFAX	2194834	435936	126462	137971	111139	65799	453636	87687	114403	313872	4649855	95450
HUDDERSFIELD	3585342	803936	421666	146875	120565	91088	440870	88067	101461	390023	6852921	132270
LEEDS	10898271	2166245	530400	809583	372406	491985	1280408	400001	363057	1764912	22054395	508790
ROTHERHAM	2104837	375062	133482	108497	61480	100275	257356	56533	101886	244754	4177369	86510
SHEFFIELD	9873781	2470058	548173	719076	593672	413309	3176369	314708	300012	1397838	27832101	490930
WAKEFIELD	1443370	231041	42474	66726	58674	34861	192174	45014	83566	162103	2921973	60130
YORK	2517163	462407	154636	123711	99079	89646	272871	56492	82823	334327	4869248	105230
CARDIFF	6425134	1008992	135807	235839	354500	232633	573909	136937	171553	840350	12825164	260340
MERTHYR TYDFIL	1360674	199816	35796	56212	56003	28102	170942	27897	64897	176888	2747306	58310
SWANSEA	3722395	645521	123226	168315	225273	104186	437124	90184	147285	466387	7364092	170160
NEWPORT	2409110	423028	73323	84039	95095	84503	392127	51720	120562	356979	5489092	107590

TOTAL EXPENDITURES FOR YEAR 1964

METRO BOROUGHS OF LONDON 1964

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
BATTERSEA	0	365325	7768	134986	11835	0	265852	52252	0	0	2592647	102820
BERMONDSEY	0	344197	17210	92969	54770	0	252939	40847	0	0	2127619	50340
BETHNAL GREEN	0	266328	6088	69892	15616	0	120646	23847	0	0	1518098	46420
CAMBERWELL	0	571053	49480	237727	108672	0	329530	57711	0	0	4464423	175740
CHELSEA	0	198759	22722	82828	18475	0	130724	37350	0	0	2510521	46200
DEPTFORD	0	266272	18186	74459	39349	0	181445	27737	0	0	1510052	68500
FINSBURY	0	421137	49994	95920	68598	0	165009	24525	0	0	3441705	32070
FULHAM	0	508587	10666	218573	97934	0	169421	45002	0	0	3119705	109410
GREENWICH	0	318959	16214	94480	40551	0	156179	45650	0	0	2411640	83630
HACKNEY	0	600214	91390	217037	63294	0	344812	47292	0	0	4131431	163170
HAMMERSMITH	0	424507	19334	142268	45420	0	193760	60345	0	0	3266302	107530
HAMPSTEAD	0	372631	55979	150384	7685	0	238937	51393	0	0	3082203	101060
HOLBORN	0	234397	4134	70216	27180	0	241256	41465	0	0	4151951	20430
ISLINGTON	0	800624	37311	373639	88401	0	508576	100911	0	0	4785588	227090
KENSINGTON	0	512632	24697	298149	24579	0	421824	93807	0	0	6508326	172990
LAMBETH	0	633112	50777	331739	46743	0	439127	78742	0	0	6082575	223140
LEWISHAM	0	710508	46708	276886	96173	0	379464	79237	0	0	5046426	223170
PADDINGTON	0	477900	28714	212936	102194	0	320664	31487	0	0	3697519	117050
POPLAR	0	375606	28795	109498	37896	0	265984	47755	0	0	2226909	68530
ST. MARYLEBONE	0	515946	19251	258027	17871	0	676837	55368	0	0	8621236	67250
ST. PANCRAS	0	556588	19190	219396	70292	0	333752	52137	0	0	5305047	121870
SHOREDITCH	0	238871	36292	75163	39974	0	170984	22954	0	0	1991505	37040
SOUTHWARK	0	445528	14893	200714	54487	0	319978	56203	0	0	3422528	87830
STEPNEY	0	502866	42670	175115	51024	0	319978	56203	0	0	3422528	91130
STOKE NEWINGTON	0	170875	4649	67436	2455	0	58000	17610	0	0	1150938	53330
WANDSWORTH	0	969005	112119	449129	79848	0	523081	148340	0	0	7317259	348450
WESTMINSTER	0	1148438	104434	566412	41750	0	1451419	213814	0	0	25444926	85840
WOOLWICH	0	585236	36978	153281	107149	0	310486	105348	0	0	4424698	149810

TOTAL EXPENDITURES FOR YEAR 1964

SCOTLAND 1964

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
ABERDEEN	4665553	0	0	0	0	197552	298073	150964	158366	534019	10033454	185034
FRASERBURGH	222734	0	0	0	0	0	38437	4627	6629	12752	381312	10729
PETERHEAD	268991	0	0	0	0	0	49363	6720	8006	14058	469309	13097
ARBROATH	326008	0	0	0	0	2341	68138	17520	14755	26700	776411	20063
DUNDEE	3984628	0	0	0	0	87800	649994	202491	140269	583525	7764404	185228
FORFAR	167824	0	0	0	0	0	26564	6767	7856	14638	367102	10150
MONTROSE	177923	0	0	0	0	0	25578	7355	8329	15287	374493	10783
DUNOON	180893	0	0	0	0	0	72201	10117	5198	16920	430402	9308
AYR	793775	0	0	0	0	0	153448	71235	27678	164446	1825967	45697
IRVINE	309679	0	0	0	0	0	33761	7719	11181	19554	650150	18951
KILMARNOCK	867542	0	0	0	0	37413	95145	45168	30977	153536	2086265	48273
PRESTWICK	211753	0	0	0	0	0	30970	15469	7645	13292	423141	12501
SALTCOATS	248785	0	0	0	0	0	23551	7184	8988	15823	470250	14353
TROON	162216	0	0	0	0	0	17409	12065	5857	10384	335647	9955
BUCKIE	158559	0	0	0	0	0	29961	8781	0	15295	290735	7647
ROTHESAY	140853	0	0	0	0	0	20430	4941	7124	10351	318695	7254
ALLOA	293179	0	0	0	0	0	21461	13026	0	17283	545352	13989
DUMFRIES	503393	0	0	0	0	17984	67884	26771	16751	27899	1146449	27574
BEARSDEN	376295	0	0	0	0	0	45279	16592	0	28849	687480	19902
CLYDEBANK	990692	0	0	0	0	24748	185313	56810	30321	74734	2262320	50385
DUMBARTON	0	0	0	0	0	15191	83243	22209	18159	40794	1178066	26496
HELENSBURGH	198147	0	0	0	0	0	40408	14031	0	14996	400662	9882
KIRKINTILLOCH	394060	0	0	0	0	0	47292	18681	0	30371	789609	19587
BUCKHAVEN AND METHIL	449474	0	0	0	0	0	0	10996	0	0	746143	20600
COWDENBEATH	245852	0	0	0	0	0	0	7878	0	0	451809	11438
DUNFERMLINE	1045817	0	0	0	0	32864	101992	43174	26653	67242	1991990	49555
KIRKCALDY	1130923	0	0	0	0	29566	56659	70522	28965	67314	2194407	51996
LOCHGELLY	191841	0	0	0	0	0	0	6070	0	0	352032	8772
ST. ANDREWS	0	0	0	0	0	0	0	7037	0	0	417833	10350
INVERNESS	589235	0	0	0	0	10065	96283	37857	30987	92337	1200614	30266
GLASGOW	24269337	0	0	0	0	672628	1990209	1415772	1189288	4905525	58726265	1018582
AIRDRIE	644476	0	0	0	0	11148	50646	23263	20435	84910	1439751	34911
COATBRIDGE	1059792	0	0	0	0	17238	112352	36330	33441	161751	2342410	54688
HAMILTON	799886	0	0	0	0	19362	125229	40402	26290	136454	1768666	43967
MOTHERWELL AND WISHAW	1402946	0	0	0	0	13453	98067	79695	0	220468	2995078	76249
RUTHERGLEN	469062	0	0	0	0	3573	54611	26921	14805	31364	1033888	26023
EDINBURGH	8357337	0	0	0	0	329906	1470261	499320	326599	1996941	18370723	473270
MUSSELBURGH	346169	0	0	0	0	0	28075	10962	0	21626	621659	17805
ELGIN	204557	0	0	0	0	0	52191	13077	6266	13263	442256	12277
PERTH	0	0	0	0	0	20457	99770	43903	34824	143068	1637469	41497
BARRHEAD	267359	0	0	0	0	0	28664	7127	14679	23356	543023	16129
GOUROCK	169996	0	0	0	0	0	22923	12774	9342	14739	347847	10169
GREENOCK	1284334	0	0	0	0	39543	128937	68620	67995	289221	3006738	74492
JOHNSTONE	349162	0	0	0	0	0	36032	12528	19167	30286	765063	19876
PAISLEY	1613326	0	0	0	0	36732	153611	104222	87565	297388	3836475	96637
PORT GLASGOW	394098	0	0	0	0	9206	47110	19029	20953	33628	827974	22524
RENFREW	473389	0	0	0	0	0	60186	30628	24854	39418	833669	18234

TOTAL EXPENDITURES FOR YEAR 1964

SCOTLAND 1964

CITY	ED.	HEALTH	SEWAGE	REFUSE	PARKS	CHILD.	HIWAY	LIGHT	FIRE	POLICE	TOTAL	POP.
HAWICK	288342	0	0	0	0	0	55637	6475	0	24116	635359	16178
GALASHIELS	238108	0	0	0	0	0	53916	11247	6232	17378	515145	12269
FALKIRK	623272	0	0	0	0	20606	115510	32835	24823	39790	1560197	38042
GRANGEMOUTH	858526	0	0	0	0	0	105389	19295	29041	58088	1605962	20425
KILSYTH	172823	0	0	0	0	0	23290	6650	5846	11800	311448	9687
STIRLING	461393	0	0	0	0	15719	59642	20559	18425	31943	1062374	27503
BATHGATE	242195	0	0	0	0	0	49743	12664	6362	15521	504499	13467
BO NESS	245511	0	0	0	0	0	27714	6525	6449	15333	458185	13262

APPENDIX C

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(1) Average Population	(2) Education	(3) Public Health	(4) Sewerage and Sewage Disposal	(5) House and Trade Refuse
Reading	119,941	4,422	864	318	190
Birkenhead	143,028	3,832	688	122	221
Chester	59,431	4,162	872	243	245
Stockport	141,929	3,838	765	158	245
Wallasey	103,221	3,648	1,039	46	205
Carlisle	70,254	4,179	729	172	230
Derby	131,961	4,181	1,293	574	238
Exeter	78,459	3,770	619	238	169
Plymouth	214,193	3,479	712	131	188
Darlington	83,796	3,867	628	208	217
Gateshead	106,149	3,942	702	87	244
South Shields	108,838	3,747	574	56	208
Sunderland	187,978	4,428	488	79	233
West Hartlepool	76,556	3,720	829	42	153
East Ham	107,853	4,439	916	199	259
Southend-on-Sea	162,033	3,695	775	244	245
West Ham	160,679	4,196	763	207	201

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(6) Parks, Pleasure Grounds and Open Spaces	(7) Protection of Children	(8) Highways, Bridges and Footpaths
Reading	179	132	497
Birkenhead	181	87	351
Chester	104	149	525
Stockport	241	126	312
Wallasey	204	102	230
Carlisle	148	126	339
Derby	287	126	468
Exeter	154	144	666
Plymouth	189	160	619
Darlington	111	111	294
Gateshead	160	151	456
South Shields	285	143	414
Sunderland	135	169	420
West Hartlepool	181	197	279
East Ham	145	161	331
Southend-on-Sea	321	106	864
West Ham	103	153	512

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(9) Public Lighting	(10) Fire Service	(11) Police	(12) Total Expenditures on Rate Fund Accounts
Reading	114	129	581	9,004
Birkenhead	122	204	841	7,567
Chester	99	204	258	8,060
Stockport	106	133	538	7,220
Wallasey	109	173	575	7,679
Carlisle	135	183	523	7,690
Derby	105	186	591	8,947
Exeter	114	189	617	9,296
Plymouth	104	185	575	7,534
Darlington	119	158	269	7,286
Gateshead	140	133	506	8,608
South Shields	115	140	500	7,603
Sunderland	97	180	415	7,792
West Hartlepool	102	131	271	6,902
East Ham	58	164	0	8,421
Southend-on-Sea	80	188	728	9,549
West Ham	70	129	0	9,178

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(1) Average Population	(2) Education	(3) Public Health	(4) Sewerage and Sewage Disposal	(5) House and Trade Refuse
Bristol	435,525	3,972	874	248	197
Gloucester	69,481	5,227	1,032	341	167
Bournemouth	147,370	3,310	1,032	161	254
Portsmouth	223,561	3,906	686	205	185
Southampton	202,989	4,366	777	183	204
Canterbury	30,663	5,967	611	138	187
Barrow-in-Furness	64,836	3,846	822	138	241
Blackburn	105,588	4,052	720	143	283
Blackpool	147,439	3,283	1,101	185	337
Bolton	160,629	4,388	938	261	216
Bootle	82,388	3,935	688	160	166
Burnley	80,668	4,357	999	256	235
Bury	59,879	3,290	825	230	279
Liverpool	750,399	4,161	899	133	282
Manchester	664,348	4,562	1,072	232	338
Oldham	116,125	4,060	821	148	232
Preston	113,290	4,439	902	223	234

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(6) Parks, Pleasure Grounds and Open Spaces	(7) Protection of Children	(8) Highways, Bridges and Footpaths
Bristol	152	145	468
Gloucester	127	104	544
Bournemouth	650	117	565
Portsmouth	403	107	403
Southampton	431	131	431
Canterbury	171	108	570
Barrow-in-Furness	141	145	481
Blackburn	134	123	547
Blackpool	259	69	564
Bolton	214	139	526
Bootle	177	94	267
Burnley	264	103	603
Bury	158	83	406
Liverpool	197	180	531
Manchester	205	202	558
Oldham	187	185	462
Preston	167	118	283

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(9) Public Lighting	(10) Fire Service	(11) Police	(12) Total Expenditures on Rate Fund Accounts
Bristol	93	270	700	8,256
Gloucester	102	171	305	9,330
Bournemouth	149	180	582	8,066
Portsmouth	69	152	648	7,883
Southampton	91	179	636	8,663
Canterbury	90	172	311	10,276
Barrow-in-Furness	121	204	664	9,881
Blackburn	129	143	577	8,335
Blackpool	175	171	608	7,912
Bolton	168	155	574	8,700
Bootle	100	299	565	8,023
Burnley	150	188	723	9,737
Bury	135	231	273	7,176
Liverpool	208	224	1,051	9,458
Manchester	167	158	849	9,604
Oldham	199	209	612	8,461
Preston	102	168	638	9,560

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(1) Average Population	(2) Education	(3) Public Health	(4) Sewerage and Sewage Disposal	(5) House and Trade Refuse
Rochdale	85,450	3,983	873	208	263
St. Helens	108,918	4,004	1,042	414	245
Salford	157,988	4,032	1,054	216	272
Southport	81,046	3,065	1,131	239	249
Warrington	77,533	4,068	1,076	335	324
Wigan	79,870	4,050	1,042	335	251
Leicester	274,968	4,803	941	306	198
Grimsby	96,440	4,100	1,552	224	260
Lincoln	74,973	3,665	601	164	223
Great Yarmouth	52,020	4,548	1,088	131	157
Norwich	119,014	4,146	1,051	517	175
Northampton	102,994	3,527	991	326	251
Newcastle	268,250	4,022	619	53	196
Tynemouth	70,160	3,268	296	53	183
Nottingham	313,400	4,219	888	285	200
Oxford	105,744	4,220	976	398	194
Bath	81,498	5,210	720	157	247

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(6) Parks, Pleasure Grounds and Open Spaces	(7) Protection of Children	(8) Highways, Bridges and Footpaths
Rochdale	183	123	604
St. Helens	256	90	389
Salford	225	190	407
Southport	390	49	531
Warrington	197	186	337
Wigan	277	142	399
Leicester	267	241	416
Grimsby	97	161	365
Lincoln	152	135	434
Great Yarmouth	402	97	445
Norwich	195	148	550
Northampton	233	109	522
Newcastle	126	141	607
Tynemouth	150	142	380
Nottingham	218	122	352
Oxford	184	173	505
Bath	160	115	555

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(9) Public Lighting	(10) Fire Service	(11) Police	(12) Total Expenditures on Rate Fund Accounts
Rochdale	204	199	666	9,015
St. Helens	132	214	579	8,315
Salford	125	190	803	8,865
Southport	173	161	709	7,703
Warrington	130	199	605	8,974
Wigan	103	205	638	9,330
Leicester	94	125	526	9,338
Grimsby	90	151	675	8,142
Lincoln	98	183	580	7,924
Great Yarmouth	144	240	684	10,509
Norwich	106	144	590	8,499
Northampton	174	159	571	7,972
Newcastle	167	171	654	8,255
Tynemouth	128	205	559	6,628
Nottingham	103	126	662	8,361
Oxford	123	174	629	9,541
Bath	93	174	542	9,514

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(1) Average Population	(2) Education	(3) Public Health	(4) Sewerage and Sewage Disposal	(5) House and Trade Refuse
Burton-upon-Trent	49,915	4,703	1,172	613	243
Smethwick	70,340	3,893	856	145	275
Stoke-on-Trent	268,231	4,548	895	344	241
Walsall	117,388	3,756	780	224	179
West Bromwich	95,261	4,042	895	344	212
Wolverhampton	148,616	4,537	843	277	235
Ipswich	116,360	3,665	704	173	176
Croydon	251,426	3,991	777	204	219
Brighton	161,189	4,061	863	45	222
Eastbourne	59,730	4,043	1,009	164	282
Hastings	65,500	3,289	850	102	172
Birmingham	1,104,415	4,017	928	173	327
Coventry	286,415	4,843	639	225	229
Dudley	64,079	3,976	772	159	209
Worcester	65,574	5,189	589	203	158
Kingston	301,694	4,077	846	343	280
Middlesbrough	155,236	4,434	728	134	224

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(6) Parks, Pleasure Grounds and Open Spaces	(7) Protection of Children	(8) Highways, Bridges and Footpaths
Burton-upon-Trent	131	165	326
Smethwick	165	133	253
Stoke-on-Trent	189	148	399
Walsall	165	151	351
West Bromwich	177	138	424
Wolverhampton	156	105	502
Ipswich	121	101	370
Croydon	213	119	506
Brighton	384	149	787
Eastbourne	360	105	469
Hastings	343	145	526
Birmingham	213	169	581
Coventry	115	154	388
Dudley	238	158	489
Worcester	137	162	494
Kingston	125	166	367
Middlesbrough	180	176	418

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(9) Public Lighting	(10) Fire Service	(11) Police	(12) Total Expenditures on Rate Fund Accounts
Burton-upon-Trent	96	218	245	8,726
Smethwick	106	171	276	7,348
Stoke-on-Trent	108	116	462	8,661
Walsall	81	149	512	7,409
West Bromwich	168	148	199	7,614
Wolverhampton	109	137	538	8,395
Ipswich	74	159	457	7,338
Croydon	98	162	147	8,041
Brighton	129	172	707	9,490
Eastbourne	138	179	741	9,146
Hastings	130	186	727	8,315
Birmingham	122	166	708	9,221
Coventry	70	139	486	9,362
Dudley	126	189	578	7,778
Worcester	112	157	639	9,250
Kingston	103	199	695	8,522
Middlesbrough	139	163	588	8,511

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(1) Average Population	(2) Education	(3) Public Health	(4) Sewerage and Sewage Disposal	(5) House and Trade Refuse
Barnsley	75,194	5,202	887	241	286
Bradford	292,431	3,878	1,057	478	214
Dewsbury	53,399	4,085	832	260	165
Doncaster	85,520	5,127	1,188	409	214
Halifax	95,511	4,001	894	259	306
Huddersfield	129,800	4,530	1,076	563	201
Leeds	512,330	3,792	783	203	305
Rotherham	85,230	4,601	794	263	235
Sheffield	496,553	3,616	978	193	322
Wakefield	61,214	3,834	753	166	210
York	104,970	4,281	862	263	238
Cardiff	256,539	4,348	746	94	180
Merthyr Tydfil	58,985	4,453	709	151	191
Swansea	166,560	4,024	823	222	202
Newport	106,310	4,159	729	91	150
Battersea	106,573	0	723	23	276
Bermondsey	52,560	0	1,256	65	361

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(6) Parks, Pleasure Grounds and Open Spaces	(7) Protection of Children	(8) Highways, Bridges and Footpaths
Barnsley	143	105	1,006
Bradford	125	191	439
Dewsbury	239	123	633
Doncaster	247	152	804
Halifax	218	138	816
Huddersfield	159	155	575
Leeds	152	177	593
Rotherham	139	220	503
Sheffield	233	132	1,047
Wakefield	177	122	549
York	209	165	440
Cardiff	269	160	433
Merthyr Tydfil	201	98	511
Swansea	251	120	494
Newport	168	148	518
Battersea	24	0	433
Bermondsey	209	0	945

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(9) Public Lighting	(10) Fire Service	(11) Police	(12) Total Expenditures on Rate Fund Accounts
Barnsley	106	195	612	10,489
Bradford	169	135	648	8,258
Dewsbury	155	246	547	8,621
Doncaster	121	170	549	10,740
Halifax	192	222	623	8,602
Huddersfield	145	140	562	9,008
Leeds	169	129	604	8,053
Rotherham	133	212	536	9,104
Sheffield	130	111	537	9,892
Wakefield	136	232	493	8,152
York	111	146	605	8,582
Cardiff	82	115	586	8,602
Merthyr Tydfil	175	174	589	8,722
Swansea	106	168	501	8,099
Newport	70	202	620	8,851
Battersea	88	0	0	0
Bermondsey	137	0	0	0

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(1) Average Population	(2) Education	(3) Public Health	(4) Sewerage and Sewage Disposal	(5) House and Trade Refuse
Bethnal Green	47,818	0	1,136	33	340
Camberwell	175,473	0	629	65	265
Chelsea	48,843	0	848	81	368
Deptford	69,291	0	768	43	237
Finsbury	33,424	0	2,394	231	464
Fulham	112,293	0	832	23	340
Greenwich	86,634	0	706	44	246
Hackney	163,446	0	733	96	268
Hammersmith	108,801	0	710	34	263
Hampstead	97,846	0	716	116	310
Holborn	21,095	0	2,007	52	652
Islington	226,185	0	608	28	337
Kensington	169,200	0	616	38	348
Lambeth	223,359	0	512	46	266
Lewisham	221,651	0	569	44	238
Paddington	115,193	0	836	51	362
Poplar	65,956	0	1,147	80	345

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(6) Parks, Pleasure Grounds and Open Spaces	(7) Protection of Children	(8) Highways, Bridges and Footpaths
Bethnal Green	63	0	509
Camberwell	105	0	411
Chelsea	69	0	687
Deptford	116	0	520
Finsbury	398	0	997
Fulham	161	0	326
Greenwich	80	0	361
Hackney	62	0	452
Hammersmith	87	0	355
Hampstead	15	0	557
Holborn	248	0	1,878
Islington	75	0	300
Kensington	33	0	476
Lambeth	38	0	395
Lewisham	71	0	300
Paddington	91	0	469
Poplar	107	0	792

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(9) Public Lighting	(10) Fire Service	(11) Police	(12) Total Expenditures on Rate Fund Accounts
Bethnal Green	104	0	0	0
Camberwell	64	0	0	0
Chelsea	183	0	0	0
Deptford	80	0	0	0
Finsbury	161	0	0	0
Fulham	77	0	0	0
Greenwich	116	0	0	0
Hackney	66	0	0	0
Hammersmith	128	0	0	0
Hampstead	99	0	0	0
Holborn	426	0	0	0
Islington	98	0	0	0
Kensington	115	0	0	0
Lambeth	89	0	0	0
Lewisham	92	0	0	0
Paddington	116	0	0	0
Poplar	154	0	0	0

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and services or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(1) Average Population	(2) Education	(3) Public Health	(4) Sewerage and Sewage Disposal	(5) House and Trade Refuse
St. Marylebone	69,293	0	1,482	58	728
St. Pancras	126,813	0	801	32	338
Shoreditch	41,110	0	1,097	84	375
Southwark	88,110	0	1,017	26	462
Stepney	93,271	0	1,158	138	418
Stoke Newington	51,586	0	695	25	264
Wandsworth	343,088	0	518	52	234
Westminster	90,516	0	2,204	204	1,041
Wollwich	146,820	0	854	35	288
Aberdeen	186,071	4,551	0	0	0
Fraserburgh	10,546	4,682	0	0	0
Peterhead	12,864	4,641	0	0	0
Arbroath	19,884	2,484	0	0	0
Dundee	182,303	3,903	0	0	0
Forfar	10,244	3,599	0	0	0
Montrose	10,844	3,630	0	0	0
Dunoon	9,385	4,587	0	0	0

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(6) Parks, Pleasure Grounds and Open Spaces	(7) Protection of Children	(8) Highways, Bridges and Footpaths
St. Marylebone	48	0	1,691
St. Pancras	85	0	546
Shoreditch	180	0	826
Southwark	124	0	612
Stepney	107	0	748
Stoke Newington	40	0	225
Wandsworth	52	0	274
Westminster	101	0	2,220
Woolwich	139	0	395
Aberdeen	0	205	288
Fraserburgh	0	0	794
Peterhead	0	0	908
Arbroath	0	32	521
Dundee	0	83	821
Forfar	0	0	547
Montrose	0	0	613
Dunoon	0	0	1,734

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(9) Public Lighting	(10) Fire Service	(11) Police	(12) Total Expenditures on Rate Fund Accounts
St. Marylebone	157	0	0	0
St. Pancras	101	0	0	0
Shoreditch	149	0	0	0
Southwark	138	0	0	0
Stepney	152	0	0	0
Stoke Newington	76	0	0	0
Wandsworth	107	0	0	0
Westminster	491	0	0	0
Wollwich	139	0	0	0
Aberdeen	170	135	530	0
Fraserburgh	104	130	256	0
Peterhead	113	128	244	0
Arbroath	179	133	243	0
Dundee	230	133	587	0
Forfar	155	167	325	0
Montrose	146	168	323	0
Dunoon	223	149	456	0

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(1) Average Population	(2) Education	(3) Public Health	(4) Sewerage and Sewage Disposal	(5) House and Trade Refuse
Ayr	44,667	2,557	0	0	0
Irvine	18,371	3,574	0	0	0
Kilmarnock	46,693	2,502	0	0	0
Prestwick	12,508	3,684	0	0	0
Saltcoats	14,250	3,869	0	0	0
Troon	9,852	3,703	0	0	0
Buckie	7,661	4,662	0	0	0
Rothesay	7,293	4,327	0	0	0
Alloa	14,264	4,650	0	0	0
Dumfries	27,438	2,679	0	0	0
Bearsden	19,234	4,149	0	0	0
Clydebank	50,617	3,827	0	0	0
Dumbarton	26,582	2,492	0	0	0
Helensburgh	9,835	4,279	0	0	0
Kirkintilloch	19,108	4,289	0	0	0
Buckhaven	20,886	4,600	0	0	0
Cowdenbeath	11,627	4,532	0	0	0

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(6) Parks, Pleasure Grounds and Open Spaces	(7) Protection of Children	(8) Highways, Bridges and Footpaths
Ayr	0	0	334
Irvine	0	0	333
Kilmarnock	0	149	410
Prestwick	0	0	522
Saltcoats	0	0	344
Troon	0	0	340
Buckie	0	0	770
Rothesay	0	0	664
Alloa	0	0	335
Dumfries	0	91	470
Bearsden	0	0	509
Clydebank	0	83	511
Dumbarton	0	127	463
Helensburgh	0	0	744
Kirkintillock	0	0	499
Buckhaven	0	0	128
Cowdenbeath	0	0	155

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(9) Public Lighting	(10) Fire Service	(11) Police	(12) Total Expenditures on Rate Fund Accounts
Ayr	258	91	661	0
Irvine	92	120	227	0
Kilmarnock	187	92	602	0
Prestwick	261	124	232	0
Saltcoats	117	130	246	0
Troon	257	119	238	0
Buckie	178	0	318	0
Rothesay	183	200	307	0
Alloa	211	0	279	0
Dumfries	144	89	199	0
Bearsden	208	0	319	0
Clydebank	217	108	269	0
Dumbarton	192	104	268	0
Helensburgh	338	0	327	0
Kirkintilloch	220	0	333	0
Buckhaven	120	0	0	0
Cowdenbeath	156	0	0	0

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(1) Average Population	(2) Education	(3) Public Health	(4) Sewerage and Sewage Disposal	(5) House and Trade Refuse
Dunfermline	47,876	2,911	0	0	0
Kirkcaldy	52,348	2,986	0	0	0
Lochgelly	8,945	0	0	0	0
St. Andrews	10,194	4,805	0	0	0
Inverness	29,152	5,844	0	0	0
Glasgow	1,057,977	4,334	0	0	0
Airdrie	33,677	2,813	0	0	0
Coatbridge	53,943	2,890	0	0	0
Hamilton	42,242	2,839	0	0	0
Motherwell and Wishaw	73,279	2,844	0	0	0
Rutherglen	25,111	2,732	0	0	0
Edinburgh	471,620	3,226	0	0	0
Musselburgh	17,714	4,428	0	0	0
Elgin	12,258	3,650	0	0	0
Perth	41,094	2,377	0	0	0
Barrhead	15,508	3,473	0	0	0
Gourock	10,033	3,433	0	0	0

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(6) Parks, Pleasure Grounds and Open Spaces	(7) Protection of Children	(8) Highways, Bridges and Footpaths
Dunfermline	0	139	400
Kirkcaldy	0	116	226
Lochgelly	0	0	0
St. Andrews	0	0	388
Inverness	0	65	628
Glasgow	0	123	416
Airdrie	0	66	284
Coatbridge	0	56	350
Hamilton	0	111	475
Motherwell and Wishaw	0	38	275
Rutherglen	0	37	410
Edinburgh	0	117	496
Mussleburgh	0	0	356
Elgin	0	0	852
Perth	0	92	383
Barrhead	0	0	332
Gourock	0	0	504

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(9) Public Lighting	(10) Fire Service	(11) Police	(12) Total Expenditures on Rate Fund Accounts
Dunfermline	171	93	129	0
Kirkcaldy	268	96	231	0
Lochgelly	146	0	0	0
St. Andrews	158	0	0	0
Inverness	261	219	576	0
Glasgow	297	191	862	0
Airdrie	134	99	466	0
Coatbridge	127	100	529	0
Hamilton	200	105	560	0
Motherwell and Wishaw	210	0	502	0
Rutherglen	210	101	230	0
Edinburgh	217	104	780	0
Mussleburgh	144	121	284	0
Elgin	249	106	236	0
Perth	226	130	601	0
Barrhead	154	178	300	0
Gourock	267	177	296	0

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(1) Average Population	(2) Education	(3) Public Health	(4) Sewerage and Sewage Disposal	(5) House and Trade Refuse
Greenock	76,322	2,334	0	0	0
Johnstone	19,553	3,529	0	0	0
Paisley	96,586	2,264	0	0	0
Port Glasgow	23,014	2,396	0	0	0
Renfrew	18,149	6,028	0	0	0
Hawick	16,031	3,960	0	0	0
Galashiels	12,254	4,133	0	0	0
Falkirk	37,671	2,523	0	0	0
Grangemouth	19,791	8,964	0	0	0
Kilsyth	9,732	4,282	0	0	0
Stirling	27,367	2,573	0	0	0
Bathgate	13,244	3,941	0	0	0
Bo'Ness	12,279	3,749	0	0	0

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(6) Parks, Pleasure Grounds and Open Spaces	(7) Protection of Children	(8) Highways, Bridges and Footpaths
Greenock	0	113	355
Johnstone	0	0	369
Paisley	0	70	307
Port Glasgow	0	91	393
Renfrew	0	0	722
Hawick	0	0	777
Galashiels	0	0	971
Falkirk	0	107	440
Grangemouth	0	0	1,018
Kilsyth	0	0	577
Stirling	0	132	350
Bathgate	0	0	666
Bo'Ness	0	0	457

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Single Regression and Correlation Analysis)

Note: Data shown below represent averages over data record. Data relating to expenditures are given in pence per capita. Where zero values appear this indicates that either data were not available for the particular authority and service or as in the case of total expenditures the zeros indicate that the expenditure data were not used in the regression and correlation analysis.

Local Authority	(9) Public Lighting	(10) Fire Service	(11) Police	(12) Total Expenditures on Rate Fund Accounts
Greenock	206	146	708	0
Johnstone	132	188	307	0
Paisley	182	143	568	0
Port Glasgow	185	147	257	0
Renfrew	498	316	493	0
Hawick	101	0	309	0
Galashiels	193	107	291	0
Falkirk	163	102	211	0
Grangemouth	217	286	615	0
Kilsyth	165	145	292	0
Stirling	136	101	230	0
Bathgate	161	112	259	0
Bo'Ness	114	106	243	0

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variables)

Local Authority	(1) Population Enumerated (1961)	(2) Population Change (1951-1961) (Percent)	(3) Area (Acres)	(4) Population Density (Per Acre)	(5) Job Ratio
Reading	119,870	5.0	9,105	13.17	105
Birkenhead	141,683	-0.6	8,618	16.44	95
Chester	59,283	4.1	4,660	12.73	122
Stockport	142,469	0.5	8,440	16.88	88
Wallasey	103,213	1.8	5,913	17.46	49
Carlisle	71,112	4.9	6,092	11.68	103
Derby	132,325	-6.3	8,116	16.31	165
Exeter	80,215	6.2	9,035	8.88	120
Plymouth	204,279	-1.8	13,140	15.55	112
Darlington	84,162	-0.9	6,469	13.01	110
Gateshead	103,232	-10.3	4,560	22.64	102
South Shields	109,533	2.8	4,876	22.47	78
Sunderland	189,629	4.5	8,575	22.12	104
West Hartlepool	77,073	6.1	4,679	16.48	89
East Ham	105,359	-12.8	3,324	31.70	50
Southend-on-Sea	164,976	8.7	10,286	16.04	81
West Ham	157,186	-8.1	4,689	33.53	120
Bristol	436,440	-1.5	26,350	16.57	106
Gloucester	69,687	3.6	5,294	13.17	119
Bournemouth	153,965	6.3	11,448	13.45	101
Portsmouth	215,198	-7.9	9,249	23.27	118
Southampton	204,707	7.8	11,543	17.74	112

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variables)

Local Authority	(6) Per Capita Retail Sales In £	(7) Per Capita Rateable Value In £	(8) Ratio Revenue to Income	(9) Per Capita Expenditures In £
Reading	285	17.91	214	39
Birkenhead	161	12.63	289	33
Chester	334	16.49	213	34
Stockport	162	12.03	268	30
Wallasey	127	13.63	231	31
Carlisle	246	12.60	248	33
Derby	269	16.16	212	39
Exeter	249	21.73	221	40
Plymouth	192	16.77	211	31
Darlington	216	16.23	220	32
Gateshead	141	11.83	278	37
South Shields	154	10.60	330	32
Sunderland	180	12.70	284	33
West Hartlepool	172	12.07	316	30
East Ham	185	14.02	204	35
Southend-on-Sea	209	18.99	238	41
West Ham	161	17.33	206	39
Bristol	188	17.31	208	34
Gloucester	260	15.67	217	39
Bournemouth	279	26.03	188	32
Portsmouth	217	18.39	222	32
Southampton	224	19.03	224	37

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variables)

Local Authority	(1) Population Enumerated (1961)	(2) Population Change (1951-1961) (Percent)	(3) Area (Acres)	(4) Population Density (Per Acre)	(5) Job Ratio
Canterbury	30,376	9.2	4,798	6.33	131
Barrow-in-Furness	64,824	-3.9	11,002	5.90	110
Blackburn	106,114	-4.6	8,088	13.12	108
Blackpool	152,133	3.3	8,609	17.68	89
Bolton	160,887	-3.8	15,280	10.53	104
Bootle	82,829	10.5	3,057	27.10	111
Burnley	80,588	-5.2	4,686	17.20	104
Bury	59,984	1.9	7,433	8.07	108
Liverpool	747,490	-5.5	27,810	26.88	121
Manchester	661,041	-6.0	27,255	24.26	132
Oldham	115,426	-6.3	6,392	18.06	95
Preston	113,208	-6.7	6,357	17.81	127
Rochdale	85,785	-3.0	9,556	8.98	106
St. Helens	108,348	-3.7	8,865	12.23	111
Salford	154,963	-13.0	5,203	29.79	94
Southport	81,976	-2.5	9,652	8.50	86
Warrington	75,533	-6.4	4,520	16.71	126
Wigan	78,702	-6.9	5,083	15.49	101
Leicester	273,298	-4.2	16,985	16.09	125
Grimsby	96,665	2.2	5,882	16.44	108
Lincoln	77,065	9.6	7,518	10.25	117
Great Yarmouth	52,860	3.4	3,689	14.33	113

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variables)

Local Authority	(6) Per Capita Retail Sales In £	(7) Per Capita Rateable Value In £	(8) Ratio Revenue to Income	(9) Per Capita Expenditures In £
Canterbury	361	17.76	294	44
Barrow-in-Furness	158	13.27	285	45
Blackburn	180	11.91	300	35
Blackpool	240	23.47	198	33
Bolton	184	12.80	271	37
Bootle	97	12.68	258	35
Burnley	173	11.49	325	40
Bury	163	12.69	245	31
Liverpool	182	14.04	259	40
Manchester	212	17.11	195	40
Oldham	169	11.82	294	36
Preston	233	12.84	278	37
Rochdale	162	12.71	269	38
St. Helens	161	9.78	362	34
Salford	123	11.50	283	38
Southport	214	19.31	206	33
Warrington	223	12.96	305	39
Wigan	238	11.97	341	41
Leicester	236	17.68	220	40
Grimsby	203	12.70	279	34
Lincoln	235	12.50	261	32
Great Yarmouth	249	18.38	233	44

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variables)

Local Authority	(1) Population Enumerated (1961)	(2) Population Change (1951-1961) (Percent)	(3) Area (Acres)	(4) Population Density (Per Acre)	(5) Job Ratio
Norwich	119,904	-1.1	8,141	14.73	138
Northampton	105,361	0.9	6,201	16.99	110
Newcastle-upon-Tyne	269,389	-7.7	11,094	24.29	148
Tynemouth	70,112	5.3	4,679	14.99	86
Nottingham	311,645	1.2	18,370	16.97	118
Oxford	106,124	7.5	8,785	12.08	157
Bath	80,856	2.0	6,278	12.88	101
Burton-upon-Trent	50,766	3.3	4,219	12.04	117
Smethwick	68,372	-10.5	2,496	27.40	107
Stoke-on-Trent	265,506	-3.5	21,209	12.52	115
Walsall	117,836	2.9	8,780	13.42	97
West Bromwich	95,909	9.0	7,180	13.36	95
Wolverhampton	150,385	-7.6	9,126	16.48	130
Ipswich	117,325	9.2	9,957	11.79	109
Croydon	252,387	1.0	12,672	19.92	84
Brighton	162,757	3.0	14,347	11.35	101
Eastbourne	60,897	5.3	10,957	5.56	108
Hastings	66,346	1.3	7,323	9.06	91
Birmingham	1,105,651	-0.6	51,147	21.62	117
Coventry	305,060	18.1	19,140	15.94	113
Dudley	61,748	-4.2	4,328	14.27	91
Worcester	65,865	6.1	6,114	10.78	119

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variables)

Local Authority	(6) Per Capita Retail Sales In £	(7) Per Capita Rateable Value In £	(8) Ratio Revenue to Income	(9) Per Capita Expenditures In £
Norwich	261	15.24	195	36
Northampton	232	45.70	203	34
Newcastle-upon-Tyne	293	19.16	214	36
Tynemouth	145	12.34	280	29
Nottingham	224	15.21	217	36
Oxford	281	21.01	206	41
Bath	238	14.99	261	40
Burton-upon-Trent	221	14.39	220	36
Smethwick	177	12.52	233	31
Stoke-on-Trent	166	11.17	285	37
Walsall	210	11.73	276	32
West Bromwich	160	12.66	241	33
Wolverhampton	264	16.21	212	36
Ipswich	222	15.85	212	31
Croydon	222	20.05	195	34
Brighton	241	23.50	231	40
Eastbourne	275	24.35	197	38
Hastings	200	16.81	211	35
Birmingham	185	16.25	215	40
Coventry	176	16.85	236	41
Dudley	216	13.04	237	32
Worcester	246	15.65	240	37

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variables)

Local Authority	(1) Population Enumerated (1961)	(2) Population Change (1951-1961) (Percent)	(3) Area (Acres)	(4) Population Density (Per Acre)	(5) Job Ratio
Kingston-upon-Hull	303,268	1.4	14,421	21.03	106
Middlesbrough	157,308	6.8	7,131	22.06	89
Barnsley	74,650	-1.3	7,817	9.55	102
Bradford	295,768	1.2	25,525	11.59	111
Dewsbury	52,942	-1.0	6,720	7.88	94
Doncaster	86,402	5.3	8,371	10.33	138
Halifax	96,073	-2.4	14,080	6.83	106
Huddersfield	130,302	1.0	14,147	9.21	110
Leeds	510,597	0.9	40,615	12.58	109
Rotherham	85,346	3.6	9,255	9.23	114
Sheffield	493,954	-3.7	39,586	12.48	112
Wakefield	61,591	2.0	5,799	10.62	137
York	104,468	-0.9	6,933	15.07	121
Cardiff	256,270	5.2	15,085	16.99	121
Merthyr Tydfil	59,008	-3.5	17,760	3.33	89
Swansea	166,740	3.6	21,600	7.72	95
Newport	108,107	1.6	7,693	14.06	109

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variables)

Local Authority	(6) Per Capita Retail Sales In £	(7) Per Capita Rateable Value In £	(8) Ratio Revenue to Income	(9) Per Capita Expenditures In £
Kingston-upon-Hull	179	12.11	267	36
Middlesbrough	183	11.25	330	36
Barnsley	254	10.52	369	45
Bradford	175	12.76	266	36
Dewsbury	171	11.32	312	37
Doncaster	300	15.10	240	40
Halifax	179	11.88	275	36
Huddersfield	190	13.33	240	39
Leeds	189	14.31	228	34
Rotherham	190	13.56	247	39
Sheffield	181	13.73	293	43
Wakefield	235	13.80	260	35
York	235	13.31	260	36
Cardiff	202	17.44	240	38
Merthyr Tydfil	133	7.77	385	37
Swansea	183	13.89	233	34
Newport	208	14.39	222	37

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Population Change

Local Authority	Population 1951	Population 1961	Population Change (Percent Increase or Decrease)
Reading	114,196	119,870	5.0
Birkenhead	142,501	141,683	-0.6
Chester	56,952	59,283	4.1
Stockport	141,801	142,469	0.5
Wallasey	101,369	103,213	1.8
Carlisle	67,798	71,112	4.9
Derby	141,267	132,325	-6.3
Exeter	75,513	80,215	6.2
Plymouth	208,012	204,279	-1.8
Darlington	84,886	84,162	-0.9
Gateshead	115,107	103,232	-10.3
South Shields	106,598	109,533	2.8
Sunderland	181,524	189,629	4.5
West Hartlepool	72,673	77,073	6.1
East Ham	120,836	105,359	-12.8
Southend-on-Sea	151,806	164,976	8.7
West Ham	170,993	157,186	-8.1
Bristol	442,994	436,440	-1.5
Gloucester	67,290	69,687	3.6
Bournemouth	144,845	153,965	6.3
Portsmouth	233,545	215,198	-7.9
Southampton	189,821	204,707	7.8

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Population Change

Local Authority	Population 1951	Population 1961	Population Change (Percent Increase or Decrease)
Canterbury	27,817	30,376	9.2
Barrow-in-Furness	67,476	64,824	-3.9
Blackburn	111,218	106,114	-4.6
Blackpool	147,332	152,133	3.3
Bolton	167,167	160,887	-3.8
Bootle	74,977	82,829	10.5
Burnley	84,987	80,588	-5.2
Bury	58,838	59,984	1.9
Liverpool	790,838	747,490	-5.5
Manchester	703,082	661,041	-6.0
Oldham	123,218	115,426	6.3
Preston	121,367	113,208	-6.7
Rochdale	88,429	85,785	-3.0
St. Helens	112,521	108,348	-3.7
Salford	178,194	154,963	-13.0
Southport	84,039	81,976	-2.5
Warrington	80,735	75,533	-6.4
Wigan	84,560	78,702	-6.9
Leicester	285,181	273,298	-4.2
Grimsby	94,557	96,665	2.2
Lincoln	70,333	77,065	9.6
Great Yarmouth	51,105	52,860	3.4

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

	Population Change		
Local Authority	Population 1951	Population 1961	Population Change (Percent Increase or Decrease)
Norwich	121,236	119,904	-1.1
Northampton	104,432	105,361	0.9
Newcastle-upon-Tyne	291,724	269,389	-7.7
Tynemouth	66,564	70,112	5.3
Nottingham	307,850	311,645	1.2
Oxford	98,747	106,124	7.5
Bath	79,294	80,856	2.0
Burton-upon-Trent	49,167	50,766	3.3
Smethwick	76,407	68,372	-10.5
Stoke-on-Trent	275,115	265,506	-3.5
Walsall	114,535	117,836	2.9
West Bromwich	87,981	95,909	9.0
Wolverhampton	162,672	150,385	-7.6
Ipswich	107,418	117,325	9.2
Croydon	249,870	252,387	1.0
Brighton	158,068	162,757	3.0
Eastbourne	57,821	60,897	5.3
Hastings	65,522	66,346	1.3
Birmingham	1,112,685	1,105,651	-0.6
Coventry	258,242	305,060	18.1
Dudley	64,463	61,748	-4.2
Worcester	62,069	65,865	6.1

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Local Authority	Population Change		
	Population 1951	Population 1961	Population Change (Percent Increase or Decrease)
Kingston-upon-Hull	299,105	303,268	1.4
Middlesbrough	147,272	157,308	6.8
Barnsley	75,630	74,650	-1.3
Bradford	292,403	295,768	1.2
Dewsbury	53,487	52,942	-1.0
Doncaster	82,054	86,402	5.3
Halifax	98,404	96,073	-2.4
Huddersfield	129,026	130,302	1.0
Leeds	505,880	510,597	0.9
Rotherham	82,341	85,346	3.6
Sheffield	512,850	493,954	-3.7
Wakefield	60,371	61,591	2.0
York	105,415	104,468	-0.9
Cardiff	243,632	256,270	5.2
Merthyr Tydfil	61,142	59,008	-3.5
Swansea	160,988	166,740	3.6
Newport	106,420	108,107	1.6

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Population Density

Local Authority	(a) Population	(b) Area (Acres)	(c) Population Density (a ÷ b = c)
Reading	119,870	9,105	13.17
Birkenhead	141,683	8,618	16.44
Chester	59,283	4,660	12.73
Stockport	142,469	8,440	16.88
Wallasey	103,213	5,913	17.46
Carlisle	71,112	6,092	11.68
Derby	132,325	8,116	16.31
Exeter	80,215	9,035	8.88
Plymouth	204,279	13,140	15.55
Darlington	84,162	6,469	13.01
Gateshead	103,232	4,560	22.64
South Shields	109,533	4,876	22.47
Sunderland	189,629	8,575	22.12
West Hartlepool	77,073	4,679	16.48
East Ham	105,359	3,324	31.70
Southend-on-Sea	164,976	10,286	16.04
West Ham	157,186	4,689	33.53
Bristol	436,440	26,350	16.57
Gloucester	69,687	5,294	13.17
Bournemouth	153,965	11,448	13.45
Portsmouth	215,198	9,249	23.27
Southampton	204,707	11,543	17.74

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

	Population Density		
Local Authority	(a) Population	(b) Area (Acres)	(c) Population Density ($a \div b = c$)
Canterbury	30,376	4,798	6.33
Barrow-in-Furness	64,824	11,002	5.90
Blackburn	106,114	8,088	13.12
Blackpool	152,133	8,609	17.68
Bolton	160,887	15,280	10.53
Bootle	82,829	3,057	27.10
Burnley	80,588	4,686	17.20
Bury	59,984	7,433	8.07
Liverpool	747,490	27,810	26.88
Manchester	661,041	27,255	24.26
Oldham	115,426	6,392	18.06
Preston	113,208	6,357	17.81
Rochdale	85,785	9,556	8.98
St. Helens	108,348	8,865	12.23
Salford	154,963	5,203	29.79
Southport	81,976	9,652	8.50
Warrington	75,533	4,520	16.71
Wigan	78,702	5,083	15.49
Leicester	273,298	16,985	16.09
Grimsby	96,665	5,882	16.44
Lincoln	77,065	7,518	10.25
Great Yarmouth	52,860	3,689	14.33

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

	Population Density		
Local Authority	(a) Population	(b) Area (Acres)	(c) Population Density (a ÷ b = c)
Norwich	119,904	8,141	14.73
Northampton	105,361	6,210	16.99
Newcastle-upon-Tyne	269,389	11,094	24.29
Tynemouth	70,112	4,679	14.99
Nottingham	311,645	18,370	16.97
Oxford	106,124	8,785	12.08
Bath	80,856	6,278	12.88
Burton-upon-Trent	50,766	4,219	12.04
Smethwick	68,372	2,496	27.40
Stoke-on-Trent	265,506	21,209	12.52
Walsall	117,836	8,780	13.42
West Bromwich	95,909	7,180	13.36
Wolverhampton	150,385	9,126	16.48
Ipswich	117,325	9,957	11.79
Croydon	252,387	12,672	19.92
Brighton	162,757	14,347	11.35
Eastbourne	60,897	10,957	5.56
Hastings	66,346	7,323	9.06
Birmingham	1,105,651	51,147	21.62
Coventry	305,060	19,140	15.94
Dudley	61,748	4,328	14.27
Worcester	65,865	6,114	10.78

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Local Authority	Population Density (a) Population	(b) Area (Acres)	(c) Population Density (a ÷ b = c)
Kingston-upon-Hull	303,268	14,421	21.03
Middlesbrough	157,308	7,131	22.06
Barnsley	74,650	7,817	9.55
Bradford	295,768	25,525	11.59
Dewsbury	52,942	6,720	7.88
Doncaster	86,402	8,371	10.33
Halifax	96,073	14,080	6.83
Huddersfield	130,302	14,147	9.21
Leeds	510,597	40,615	12.58
Rotherham	85,346	9,255	9.23
Sheffield	493,954	39,586	12.48
Wakefield	61,591	5,799	10.62
York	104,468	6,933	15.07
Cardiff	256,270	15,085	16.99
Merthyr Tydfil	59,008	17,760	3.33
Swansea	166,740	21,600	7.72
Newport	108,107	7,693	14.06

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Job Ratio

Local Authority	(a) Enumerated Occupied Population 1961	(b) Net Daily Inflow or Outflow	(c) Population Working in Area (a plus b or a minus b)	Job Ratio (c ÷ a x 100)
Reading	56,200	+3,550	59,750	106
Birkenhead	60,580	-3,020	57,560	95
Chester	27,190	+6,230	33,420	122
Stockport	70,340	-8,220	62,120	88
Wallasey	44,130	-22,310	21,820	49
Carlisle	32,310	+1,180	33,490	103
Derby	62,950	+41,330	104,280	165
Exeter	34,740	+7,210	41,950	120
Plymouth	86,600	+10,900	97,500	112
Darlington	37,900	+3,930	41,830	110
Gateshead	45,700	+1,140	46,840	102
South Shields	44,800	-9,640	35,160	78
Sunderland	76,610	+3,770	80,380	104
West Hartlepool	30,980	-3,260	27,720	89
East Ham	54,990	-27,760	27,230	50
Southend-on-Sea	68,060	-12,930	55,130	81
West Ham	81,690	+16,730	98,420	120
Bristol	195,720	+12,460	208,180	106
Gloucester	31,610	+6,280	37,890	119
Bournemouth	61,240	+1,060	62,300	101
Portsmouth	95,710	+18,170	113,880	118
Southampton	88,540	+11,320	99,860	112

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Job Ratio

Local Authority	(a) Enumerated Occupied Population 1961	(b) Net Daily Inflow or Outflow	(c) Population Working in Area (a plus b or a minus b)	Job Ratio (c ÷ a x 100)
Canterbury	12,410	+3,950	16,360	131
Barrow-in-Furness	27,970	+3,030	31,000	110
Blackburn	54,790	+4,530	59,320	108
Blackpool	66,030	-7,110	58,920	89
Bolton	79,360	+3,600	82,960	104
Bootle	36,690	+4,260	40,950	111
Burnley	41,040	+1,740	42,780	104
Bury	29,910	+2,570	32,480	108
Liverpool	330,880	+70,000	400,880	121
Manchester	321,940	+106,210	428,150	132
Oldham	60,190	-2,590	57,600	95
Preston	57,300	+15,550	72,850	127
Rochdale	44,140	+2,770	46,910	106
St. Helens	49,340	+5,450	54,790	111
Salford	78,710	-4,570	74,140	94
Southport	35,190	-4,650	30,540	86
Warrington	36,790	+9,810	46,600	126
Wigan	36,680	+390	37,070	101
Leicester	140,350	+36,170	176,520	125
Grimsby	40,850	+3,390	44,240	108
Lincoln	33,830	+5,960	39,790	117
Great Yarmouth	21,940	+2,970	24,910	113

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Local Authority		Job Ratio		
	(a) Enumerated Occupied Population 1961	(b) Net Daily Inflow or Outflow	(c) Population Working in Area (a plus b or a minus b)	Job Ratio (c ÷ a x 100)
Norwich	54,400	+21,120	75,520	138
Northampton	51,010	+5,560	56,570	110
Newcastle-upon-Tyne	120,150	+58,560	178,710	148
Tynemouth	29,440	-4,050	25,390	86
Nottingham	153,410	+29,040	182,450	118
Oxford	47,090	+27,140	74,230	157
Bath	36,990	+730	37,720	101
Burton-upon-Trent	22,320	+3,840	26,160	117
Smethwick	35,840	+2,750	38,590	107
Stoke-on-Trent	134,800	+20,290	155,090	115
Walsall	56,720	-1,570	55,150	97
West Bromwich	47,350	-2,030	45,320	95
Wolverhampton	74,980	+22,780	97,760	130
Ipswich	49,790	+4,530	54,320	109
Croydon	122,100	-18,810	103,290	84
Brighton	71,450	+930	72,380	101
Eastbourne	25,290	+2,220	27,510	108
Hastings	25,100	-2,250	22,850	91
Birmingham	555,550	+99,530	655,080	117
Coventry	149,540	+20,450	169,990	113
Dudley	32,260	-2,720	29,540	91
Worcester	32,660	+6,270	38,930	119

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Local Authority	(a) Enumerated Occupied Population 1961	Job Ratio (b) Net Daily Inflow or Outflow	(c) Population Working in Area (a plus b or a minus b)	Job Ratio (c ÷ a x 100)
Kingston-upon-Hull	129,550	+8,890	138,440	106
Middlesbrough	66,770	-7,200	59,570	89
Barnsley	32,500	+700	33,200	102
Bradford	147,770	+17,250	165,020	111
Dewsbury	24,570	-1,270	23,300	94
Doncaster	37,710	+14,500	52,210	138
Halifax	48,510	+3,180	51,690	106
Huddersfield	66,260	+6,900	73,160	110
Leeds	249,940	+23,220	273,160	109
Rotherham	38,090	+5,710	43,800	114
Sheffield	241,690	+29,020	270,710	112
Wakefield	26,700	+9,980	36,680	137
York	50,050	+10,740	60,790	121
Cardiff	109,570	+23,400	132,970	121
Merthyr Tydfil	24,970	-2,600	22,370	89
Swansea	69,440	-2,960	66,480	95
Newport	49,130	+4,470	53,600	109

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Local Authority	Retail Sales (a) Population 1961	(b) Turnover In Thousands of £	(c) Per Capita Retail Sales In £ (b ÷ a)
Reading	119,870	34,084	285
Birkenhead	141,683	22,707	161
Chester	59,283	19,757	334
Stockport	142,469	23,022	162
Wallasey	103,213	13,024	127
Carlisle	71,112	17,431	246
Derby	132,325	35,507	269
Exeter	80,215	19,911	249
Plymouth	204,279	39,038	192
Darlington	84,162	18,162	216
Gateshead	103,232	14,496	141
South Shields	109,533	16,866	154
Sunderland	189,629	34,086	180
West Hartlepool	77,073	13,245	172
East Ham	105,359	19,486	185
Southend-on-Sea	164,976	34,334	209
West Ham	157,186	25,242	161
Bristol	436,440	81,896	188
Gloucester	69,687	18,099	260
Bournemouth	153,965	42,822	279
Portsmouth	215,198	46,528	217
Southampton	204,707	45,718	224

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Local Authority	Retail Sales (a) Population 1961	(b) Turnover In Thousands of £	(c) Per Capita Retail Sales In £ (b ÷ a)
Canterbury	30,376	10,951	361
Barrow-in-Furness	64,824	10,223	158
Blackburn	106,114	19,008	180
Blackpool	152,133	36,502	240
Bolton	160,887	29,586	184
Bootle	82,829	7,967	97
Burnley	80,588	13,874	173
Bury	59,984	9,757	163
Liverpool	747,490	135,681	182
Manchester	661,041	140,116	212
Oldham	115,426	19,417	169
Preston	113,208	26,306	233
Rochdale	85,785	13,887	162
St. Helens	108,348	17,349	161
Salford	154,963	19,063	123
Southport	81,976	17,530	214
Warrington	75,533	16,790	223
Wigan	78,702	18,684	238
Leicester	273,298	64,423	236
Grimsby	96,665	19,593	203
Lincoln	77,065	18,092	235
Great Yarmouth	52,860	13,153	249

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Local Authority	Retail Sales (a) Population 1961	(b) Turnover In Thousands of £	(c) Per Capita Retail Sales In £ (b ÷ a)
Norwich	119,904	31,256	261
Northampton	105,361	24,371	232
Newcastle-upon-Tyne	269,389	78,900	293
Tynemouth	70,112	10,136	145
Nottingham	311,645	69,644	224
Oxford	106,124	29,760	281
Bath	80,856	19,227	238
Burton-upon-Trent	50,766	11,217	221
Smethwick	68,372	12,071	177
Stoke-on-Trent	265,506	44,041	166
Walsall	117,836	24,723	210
West Bromwich	95,909	15,355	160
Wolverhampton	150,385	39,591	264
Ipswich	117,325	26,005	222
Croydon	252,387	56,002	222
Brighton	162,757	39,179	241
Eastbourne	60,897	16,709	275
Hastings	66,346	13,210	200
Birmingham	1,105,651	203,925	185
Coventry	305,060	53,498	176
Dudley	61,748	13,304	216
Worcester	65,865	16,162	246

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

	Retail Sales		
Local Authority	(a) Population 1961	(b) Turnover In Thousands of £	(c) Per Capita Retail Sales In £ (b ÷ a)
Kingston-upon-Hull	303,268	54,169	179
Middlesbrough	157,308	28,750	183
Barnsley	74,650	18,962	254
Bradford	295,768	51,637	175
Dewsbury	52,942	9,057	171
Doncaster	86,402	25,859	300
Halifax	96,073	17,136	179
Huddersfield	130,302	24,694	190
Leeds	510,597	96,163	189
Rotherham	85,346	16,140	190
Sheffield	493,954	89,141	181
Wakefield	61,591	14,474	235
York	104,468	24,516	235
Cardiff	256,270	51,539	202
Merthyr Tydfyl	59,008	7,818	133
Swansea	166,740	30,409	183
Newport	108,107	22,431	208

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Local Authority	Ratio of Total Revenues on Rate Fund Accounts to Total Income from Rates on Rate Fund Accounts (a) Total Revenues from All Sources on Rate Fund Accounts (Rates, Grants, Charges, etc.) £	(b) Total Income From Rates on Rate Fund Accounts £	(c) Ratio of Total Revenues on Rate Fund Accounts to Total Income from Rates on Rate Fund Accounts (a ÷ b = c)
Reading	4,775,319	2,230,309	214
Birkenhead	4,588,027	1,586,509	289
Chester	2,026,433	950,042	213
Stockport	4,388,228	1,635,430	268
Wallasey	3,320,886	1,434,391	231
Carlisle	2,282,640	919,600	248
Derby	5,095,629	2,401,194	212
Exeter	3,111,877	1,401,786	221
Plymouth	6,462,217	3,050,689	211
Darlington	2,673,675	1,213,171	220
Gateshead	3,807,083	1,368,726	278
South Shields	3,466,454	1,048,685	330
Sunderland	6,093,831	2,138,898	284
West Hartlepool	2,270,785	718,061	316
East Ham	3,814,765	1,866,399	204
Southend-on-Sea	6,855,761	2,871,763	238
West Ham	6,245,190	3,021,831	206
Bristol	15,186,393	7,291,507	208
Gloucester	2,638,376	1,211,775	217

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Local Authority	Ratio of Total Revenues on Rate Fund Accounts to Total Income from Rates on Rate Fund Accounts (a) Total Revenues from All Sources on Rate Fund Accounts (Rates, Grants, Charges, etc.) £	(b) Total Income From Rates on Rate Fund Accounts £	(c) Ratio of Total Revenues on Rate Fund Accounts to Total Income from Rates on Rate Fund Accounts (a ÷ b = c)
Bournemouth	4,846,842	2,570,294	188
Portsmouth	7,306,667	3,281,228	222
Southampton	7,698,944	3,425,329	224
Canterbury	1,371,523	465,918	294
Barrow-in-Furness	2,909,382	1,019,890	285
Blackburn	4,052,075	1,348,214	300
Blackpool	4,989,096	2,511,215	198
Bolton	5,974,229	2,203,257	271
Bootle	2,933,490	1,133,821	258
Burnley	3,257,702	1,001,293	325
Bury	1,898,773	773,450	245
Liverpool	30,078,613	11,601,834	259
Manchester	27,327,559	13,986,555	195
Oldham	4,082,050	1,388,002	294
Preston	4,178,864	1,501,886	278
Rochdale	3,317,523	1,230,078	269
St. Helens	3,624,888	1,001,110	362
Salford	5,827,186	2,053,113	283
Southport	2,679,759	1,299,914	206
Warrington	2,956,003	967,745	305

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Local Authority	Ratio of Total Revenues on Rate Fund Accounts to Total Income from Rates on Rate Fund Accounts (a) Total Revenues from All Sources on Rate Fund Accounts (Rates, Grants, Charges, etc.) £	(b) Total Income From Rates on Rate Fund Accounts £	(c) Ratio of Total Revenues on Rate Fund Accounts to Total Income from Rates on Rate Fund Accounts (a ÷ b = c)
Wigan	3,250,487	950,841	341
Leicester	10,844,184	4,925,967	220
Grimsby	3,335,756	1,195,205	279
Lincoln	2,512,105	1,960,543	261
Great Yarmouth	2,386,117	1,023,918	233
Norwich	4,267,171	2,177,835	195
Northampton	3,573,922	1,757,903	203
Newcastle-upon-Tyne	9,362,090	4,360,963	214
Tynemouth	2,027,102	721,696	280
Nottingham	11,511,176	5,290,182	217
Oxford	4,335,964	2,102,204	206
Bath	3,300,701	1,263,676	261
Burton-upon-Trent	1,821,432	824,289	220
Smethwick	2,207,997	947,268	233
Stoke-on-Trent	10,004,694	3,501,005	285
Walsall	3,798,946	1,373,320	276
West Bromwich	3,105,740	1,285,398	241
Wolverhampton	5,318,429	2,502,913	212
Ipswich	3,669,206	1,727,153	212

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Local Authority	Ratio of Total Revenues on Rate Fund Accounts to Total Income from Rates on Rate Fund Accounts (a) Total Revenues from All Sources on Rate Fund Accounts (Rates, Grants, Charges, etc.) £	(b) Total Income From Rates on Rate Fund Accounts £	(c) Ratio of Total Revenues on Rate Fund Accounts to Total Income from Rates on Rate Fund Accounts (a ÷ b = c)
Croydon	8,728,445	4,460,334	195
Brighton	6,419,930	2,772,856	231
Eastbourne	2,231,315	1,129,116	197
Hastings	2,278,865	1,078,186	211
Birmingham	43,844,058	20,320,127	215
Coventry	11,446,711	4,841,932	236
Dudley	2,092,683	882,101	237
Worcester	2,558,825	1,064,792	240
Kingston-upon-Hull	10,800,006	4,033,319	267
Middlesbrough	5,574,395	1,684,672	330
Barnsley	3,463,716	937,268	369
Bradford	10,728,024	4,027,981	266
Dewsbury	1,947,169	622,651	312
Doncaster	3,445,037	1,431,509	240
Halifax	3,491,814	1,265,311	275
Huddersfield	5,226,216	2,174,215	240
Leeds	17,421,519	7,619,616	228
Rotherham	3,378,548	1,363,912	247
Sheffield	21,666,844	7,401,812	293

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Local Authority	Ratio of Total Revenues on Rate Fund Accounts to Total Income from Rates on Rate Fund Accounts		
	(a) Total Revenues from All Sources on Rate Fund Accounts (Rates, Grants, Charges, etc.) £	(b) Total Income From Rates on Rate Fund Accounts £	(c) Ratio of Total Revenues on Rate Fund Accounts to Total Income from Rates on Rate Fund Accounts (a ÷ b = c)
York	3,832,393	1,470,817	260
Cardiff	9,691,558	4,022,153	240
Merthyr Tydfil	2,135,683	554,216	385
Swansea	5,733,952	2,450,853	233
Newport	3,995,854	1,799,407	222

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Local Authority	Per Capita Total Expenditures on Rate Fund Accounts (1961) (a) Total Expenditures In £	(b) Population 1961	(c) Per Capita Expenditures in £ (a ÷ b = c)
Reading	4,773,352	119,870	39
Birkenhead	4,626,918	141,683	33
Chester	2,022,286	59,283	34
Stockport	4,332,562	142,469	30
Wallasey	3,321,824	103,213	31
Carlisle	2,265,982	71,112	33
Derby	5,141,006	132,325	39
Exeter	3,161,457	80,215	40
Plymouth	6,497,186	204,279	31
Darlington	2,652,660	84,162	32
Gateshead	3,818,981	103,232	37
South Shields	3,487,649	109,533	32
Sunderland	6,163,106	189,629	33
West Hartlepool	2,357,863	77,073	30
East Ham	3,674,768	105,359	35
Southend-on-Sea	6,705,408	164,976	41
West Ham	6,093,157	157,186	39
Bristol	14,821,663	436,440	34
Gloucester	2,722,665	69,687	39
Bournemouth	4,763,161	153,965	32

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Per Capita Total Expenditures on Rate Fund Accounts
(1961)

Local Authority	(a) Total Expenditures In £	(b) Population 1961	(c) Per Capita Expenditures in £ (a ÷ b = c)
Portsmouth	7,387,848	215,198	32
Southampton	7,636,811	204,707	37
Canterbury	1,365,925	30,376	44
Barrow-in-Furness	2,882,748	64,824	45
Blackburn	3,711,960	106,114	35
Blackpool	4,924,286	152,133	33
Bolton	5,936,551	160,887	37
Bootle	2,862,680	82,829	35
Burnley	3,226,438	80,588	40
Bury	1,840,485	59,984	31
Liverpool	30,164,208	747,490	40
Manchester	26,586,923	661,041	40
Oldham	4,123,265	115,426	36
Preston	4,184,272	113,208	37
Rochdale	3,241,368	85,785	38
St. Helens	3,676,944	108,348	34
Salford	5,781,456	154,963	38
Southport	2,667,792	81,976	33
Warrington	2,963,088	75,533	39

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Per Capita Total Expenditures on Rate Fund Accounts (1961)

Local Authority	(a) Total Expenditures In £	(b) Population 1961	(c) Per Capita Expenditures in £ (a ÷ b = c)
Wigan	3,247,669	78,702	41
Leicester	10,852,395	273,298	40
Grimsby	3,328,546	96,665	34
Lincoln	2,497,347	77,065	32
Great Yarmouth	2,332,812	52,860	44
Norwich	4,261,530	119,904	36
Northampton	3,492,382	105,361	34
Newcastle-upon-Tyne	9,572,826	269,389	36
Tynemouth	1,996,197	70,112	29
Nottingham	11,208,837	311,645	36
Oxford	4,341,441	106,124	41
Bath	3,300,496	80,856	40
Burton-upon-Trent	1,811,583	50,766	36
Smethwick	2,109,951	68,372	31
Stoke-on-Trent	9,928,746	265,506	37
Walsall	3,740,627	117,836	32
West Bromwich	3,189,799	95,909	33
Wolverhampton	5,337,052	150,385	36
Ipswich	3,620,684	117,325	31

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Per Capita Total Expenditures on Rate Fund Accounts (1961)

Local Authority	(a) Total Expenditures In £	(b) Population 1961	(c) Per Capita Expenditures in £ (a ÷ b = c)
Croydon	8,620,485	252,387	34
Brighton	6,443,898	162,757	40
Eastbourne	2,251,881	60,897	38
Hastings	2,293,846	66,346	35
Birmingham	43,749,282	1,105,651	40
Coventry	11,686,444	305,060	41
Dudley	2,065,670	61,748	32
Worcester	2,489,035	65,865	37
Kingston-upon-Hull	10,861,299	303,268	36
Middlesbrough	5,674,877	157,308	36
Barnsley	3,372,724	74,650	45
Bradford	10,547,616	295,768	36
Dewsbury	1,942,882	52,942	37
Doncaster	3,472,479	86,402	40
Halifax	3,486,757	96,073	36
Huddersfield	5,119,161	130,302	39
Leeds	17,362,101	510,597	34
Rotherham	3,358,393	85,346	39
Sheffield	21,347,640	493,954	43

APPENDIX C (cont.)

COMPILATION OF DATA

(Data used in Multiple Regression and Correlation Analysis: Variable Derivation)

Per Capita Total Expenditures on Rate Fund Accounts (1961)

Local Authority	(a) Total Expenditures In £	(b) Population 1961	(c) Per Capita Expenditures in £ (a ÷ b = c)
Wakefield	2,142,436	61,591	35
York	3,814,449	104,468	36
Cardiff	9,708,556	256,270	38
Merthyr Tydfil	2,173,024	59,008	37
Swansea	5,742,292	166,740	34
Newport	3,988,675	108,107	37

APPENDIX D

COMPUTER PROGRAMS

```
          BEGIN                                                              *          *     1        0
FILE IN    CARD (2,10);                                                      *          *     2        OSTRT
FILE OUT   PCH 0(2,10);                                                      *          *     2        3
FILE OUT   LINE 4(2,15);                                                     *          *     2        7
FILE TP 2 "CITYEXP"(2,18,360,SAVE 300);                                      *          *     2        10
FILE TPO 2"CITYOUT"(2,12,240,SAVE 300);                                      *          *     2        14
FILE DSK DISK SERIAL[20:70]"TUCK""HOWARD"(2,12,120,SAVE 9);                  *          *     2        17
FILE  DSK1  DISK SERIAL[20:70]"INDATA""HOWARD"(2,18,180,SAVE 9);             *          *     2        21
COMMENT  THE DISK IS USED TO KEEP 8 YEARS PER CAPITA DATA;                   *          *     2        24
ARRAY A[0:167,0:17],B[0:18],C[0:13],CITY[0:167,0:3];                         *          *     2        24
ARRAY E[0:167,0:17],F[0:167,0:17],G[0:167,0:17];                             *          *     2        32
ARRAY  T[0:1,0:17]    ,CT[0:17];                                             *          *     2        38
ARRAY D[0:167,0:12];                                                         *          *     2        41
ARRAY H[0:167,0:12];                                                         *          *     2        43
ARRAY X[0:17],AC[0:40],BC[0:40],CC[0:10],DC[0:2];                            *          *     2        45
REAL  MAX,MIN;                                                               *          *     2        54
REAL YM,DY;                                                                  *          *     2        54
REAL TMP;                                                                    *          *     2        54
INTEGER I,J,K,L,M,N,ID,YR,CTRY,CTY;                                          *          *     2        54
INTEGER AA,FLAG,STYR;                                                        *          *     2        54
INTEGER ARRAY CID[0:168];                                                    *          *     2        54
INTEGER Y,II;                                                                *          *     2        56
COMMENT Y EQUAL NUMBER OF YEARS - 1;                                         *          *     2        56
INTEGER  NOC;                                                                *          *     2        56
COMMENT  NOC = NUMBER OF CITIES MINUS 1;                                     *          *     2        56
LABEL L1,L2,L3,EOF;                                                          *          *     2        56
LABEL EOF1;                                                                  *          *     2        56
FORMAT  FIN(7I10,X1,I3,I2,I1,I2,I1/6I10,X30);                                *          *     2        56
                                                                                          FMT SIZE    13 WDS
FORMAT FM1(X22,I8,9(X1,I7),X1,I9,X1,I7);                                     *          *     2        56
                                                                                          FMT SIZE    13 WDS
FORMAT FM2("      EXPENDITURES PER CAPITA FOR 19",I2);                       *          *     2        56
                                                                                          FMT SIZE    10 WDS
FORMAT FM3(4A6,I3,".",I2,".",I2,I12);                                        *          *     2        56
                                                                                          FMT SIZE    10 WDS
FORMAT FM5(X35,"AVERAGE PER CAPITA EXPENDITURES FOR RECORD PERIOD");         *          *     2        56
                                                                                          FMT SIZE    13 WDS
FORMAT FM6(X22,10(I2,".",I2,".",I2),I4,".",I2,".",I2,I3," -64");             *          *     2        56
                                                                                          FMT SIZE    18 WDS
FORMAT FM7(X35,"EXPENDITURE RATE OF CHANGE FOR ");                           *          *     2        56
                                                                                          FMT SIZE    10 WDS
FORMAT FM8(X32,"EXPENDITURES",X17,"RATE OF CHANGE");                         *          *     2        56
                                                                                          FMT SIZE    10 WDS
FORMAT FM9("       CITY",X18,"1957       1962       1964",X9,"57-64",X7,    *          *     2        56
          "62-64");                                                          *          *
                                                                                          FMT SIZE    14 WDS
FORMAT FM10(4A6,3I10,X3,2F12.3);                                             *          *     2        56
                                                                                          FMT SIZE     7 WDS
SWITCH FORMAT FT +(X66,"EDUCATION"),(X66,"HEALTH"),(X66,"SEWAGE"),           *          *     2        56
          (X66,"REFUSE"),(X66,"PARKS"),(X66,"CHILDREN"),(X66,"HIGHWAYS")*     *
```

```
        ,(X66,"LIGHT"),(X66,"FIRE"),(X66,"POLICE"),(X66,"TOTAL");        *      *
                                                                                       FMT SIZE  69 WDS
SWITCH FORMAT  SF ←(X8,"CITY",X12,"EDUCATION"),(X8,"CITY",X14,"HEALTH"),*      *        2       56
        (X8,"CITY",X14,"SEWAGE"),(X8,"CITY",X14,"REFUSE"),(X8,"CITY", *      *
        X15,"PARKS"),(X8,"CITY",X12,"CHILDREN"),(X8,"CITY",X12,         *      *
        "HIGHWAYS"),(X8,"CITY",X12,"LIGHTING"),(X8,"CITY",X16,"FIRE"),*      *
        (X8,"CITY",X14,"POLICE"),(X8,"CITY",X15,"TOTAL");              *      *
                                                                                       FMT SIZE  92 WDS
DEFINE  CITLST = FOR L←0 STEP 1 UNTIL 3 DO CITY #;                      *      *        2       56
    FOR I←0 STEP 1 UNTIL 167 DO READ(CARD,<X10,4A6>,FOR J←0 STEP 1      *      *        2       56
                                                                                       SEG SIZE   5 WDS
        UNTIL 3 DO CITY[I,J]];                                          *      *        2       60
    READ(CARD,<8I10>,FOR N←1 STEP 1 UNTIL 8 DO T[0,N]];                 *      *        2       72
                                                                                       SEG SIZE   4 WDS
    READ(CARD,<8I10/8I10>,FOR N←1 STEP 1 UNTIL 16 DO T[1,N]];           *      *        2       84
                                                                                       SEG SIZE   6 WDS
    T[1,17] ← 9999999;     T[1,0] ← 6999;                               *      *        2       97
    T[0,9 ] ← 9999999;     T[0,0] ← 6999;                               *      *        2      101
L2:                                                                     *      *        2      105
    READ(CARD[NO],<X79,I1>,K)[EOF1];                                    *      *        2      106
                                                                                       SEG SIZE   5 WDS
    IF K≠0 THEN                                                         *      *        2      116
        BEGIN                                                           *      *        2      117
    READ(CARD,FIN,FOR I←0 STEP 1 UNTIL 17 DO B[I])[EOF1];               *      *        2      118
    WRITE(TP,18,B[*]);                                                  *      *        2      130
    GO TO L3;                                                           *      *        2      135
        END;                                                            *      *        2      135
    IF K=0 THEN                                                         *      *        2      135
        BEGIN                                                           *      *        2      136
    READ(CARD[NO],<X29,I2>,YR);                                         *      *        2      136
                                                                                       SEG SIZE   5 WDS
                READ(CARD,<13A6>,FOR I←0 STEP 1 UNTIL 12 DO C[I]);      *      *        2      144
                                                                                       SEG SIZE   4 WDS
        END;                                                            *      *        2      156
    IF K=0 THEN GO TO L1 ELSE GO TO L2;                                 *      *        2      156
L1:                                                                     *      *        2      158
    WRITE(LINE[PAGE]);                                                  *      *        2      159
    WRITE(LINE,<X40,"TOTAL EXPENDITURES FOR YEAR 19",I2>,YR);           *      *        2      163
                                                                                       SEG SIZE  10 WDS
    WRITE(LINE[DBL]);                                                   *      *        2      170
    WRITE(LINE,<13A6>,FOR I←0 STEP 1 UNTIL 12 DO C[I]);                 *      *        2      174
                                                                                       SEG SIZE   4 WDS
     WRITE(LINE);                                                       *      *        2      186
 WRITE(LINE,<"       CITY                 ED.     HEALTH  SEWAGE  REFUSE",  *      *        2      190
        "  PARKS   CHILD.  HIWAY   LIGHT     FIRE   POLICE    TOTAL",   *      *       23      192
        "      POP.">);                                                 *      *       23      192
                                                                                       SEG SIZE  24 WDS
     WRITE(LINE);                                                       *      *        2      193
    M ← 0;                                                              *      *        2      197
    GO TO L2;                                                           *      *        2      198
L3:                                                                     *      *        2      198
    WRITE(LINE[NO],<4A6>,FOR J←0 STEP 1 UNTIL 3 DO CITY[B[7]-1,J]);     *      *        2      199
                                                                                       SEG SIZE   4 WDS
    WRITE(LINE,FM1,FOR J←0 STEP 1 UNTIL 6 DO B[J], FOR J←12 STEP 1      *      *        2      212
        UNTIL 16 DO B[J]);                                              *      *        2      221
```

```
     M ← M+1;                                                        *    *    2    229
     IF M>46 THEN GO TO L1 ELSE GO TO L2;                            *    *    2    230
EOF1:                                                                *    *    2    232
     REWIND(TP);                                                     *    *    2    233
     Y←7;                                                            *    *    2    234
     NOC ← 167;                                                      *    *    2    235
     YR ← 57;                                                        *    *    2    236
          BEGIN                                                      *    *    2    237
LABEL  L4,L5,L6,L7,L8,L9;                                            *    *    2    237
LABEL L11;                                                           *    *   25    0STRT
LABEL EOF;                                                           *    *   25    0
COMMENT PROCEDURE FOR DETERMINING PER CAPITA COST FOR EACH SERVICE;  *    *   25    0
     FOR K←0 STEP 1 UNTIL Y DO                                       *    *   25    0
          BEGIN                                                      *    *   25    1
     FOR J←0 STEP 1 UNTIL 17 DO B[J]←0;                              *    *   25    1
COMMENT   INITIALIZE DISK FILES TO ZERO;                             *    *   25    5
      FOR I←110 STEP 1 UNTIL 167 DO                                  *    *   25    5
          BEGIN                                                      *    *   25    7
     WRITE(DSK1[168×K+I],18,B[*]);                                   *    *   25    7
     WRITE(DSK [168×K+I],12,B[*]);                                   *    *   25   12
          END;                                                       *    *   25   18
     FOR I←0 STEP 1 UNTIL NOC DO                                     *    *   25   20
          BEGIN                                                      *    *   25   22
     READ(TP[NO],18,B[*]) [EOF];                                     *    *   25   22
     IF YR =63 AND B[7]=61 THEN B[8]←63;                             *    *   25   27
     IF B[8] ≠ YR THEN GO TO L6;                                     *    *   25   31
     READ(TP,18,B[*]);                                               *    *   25   32
     N ← B[7]-1;                                                     *    *   25   36
     IF B[16] =0 THEN GO TO L5;                                      *    *   25   38
     FOR J←0 STEP 1 UNTIL 6 DO                                       *    *   25   39
     A[N,J] ← B[J]/B[16];                                            *    *   25   41
     FOR J←7 STEP 1 UNTIL 10 DO                                      *    *   25   46
     A[N,J] ← B[J+5]/B[16];                                          *    *   25   47
     A[N,11] ← B[16];                                                *    *   25   52
L5:                                                                  *    *   25   55
     WRITE(DSK1[168 ×K+N],18,B[*]);                                  *    *   25   55
     WRITE( DSK[168×K +N],12,A[N,*]);                                *    *   25   60
          END;                                                       *    *   25   66
L6:  COMMENT CHANGE OF YEAR REQUIRED  NO DATA FOR 1 OR MORE CITIES;  *    *   25   69
EOF:                                                                 *    *   25   69
     FOR J←0 STEP 1 UNTIL 10 DO                                      *    *   25   69
          BEGIN                                                      *    *   25   70
     CID[0] ← 0;                                                     *    *   25   70
     FOR I←0 STEP 1 UNTIL NOC-1 DO                                   *    *   25   71
          BEGIN                                                      *    *   25   75
     CID[I+1] ← I+1;                                                 *    *   25   75
     L ← I;                                                          *    *   25   78
L4:                                                                  *    *   25   78
     IF A[CID[L],J] < A[CID[L+1],J] THEN                             *    *   25   79
          BEGIN                                                      *    *   25   82
     TMP ← CID[L];                                                   *    *   25   83
     CID[L] ← CID[L+1];                                              *    *   25   84
     CID[L+1] ← TMP;                                                 *    *   25   86
     L ← L-1;                                                        *    *   25   88
     IF L≥0 THEN GO TO L4;                                           *    *   25   89
```

```
              END;                                                       *          *    25      90
              END;                                                       *          *    25      90
          FOR I←0 STEP 1 UNTIL NOC DO                                    *          *    25      91
              BEGIN                                                      *          *    25      92
          IF(I MOD 49)= 0 THEN                                           *          *    25      92
              BEGIN                                                      *          *    25      93
          WRITE(LINE[PAGE]);                                             *          *    25      93
          WRITE(LINE,FM2,YR);                                            *          *    25      97
          WRITE(LINE[DBL]);                                              *          *    25     105
          WRITE(LINE[NO],SF[J]);                                         *          *    25     109
          WRITE(LINE,<X35,"POPULATION">);                                *          *    25     113
                                                                                       SEG SIZE    6 WDS
          WRITE(LINE);                                                   *          *    25     116
              END;                                                       *          *    25     120
          AA← ENTIER((A[CID[I],J] MOD 1.0)×240 +0.5);                    *          *    25     120
          WRITE(LINE,FM3,FOR L←0 STEP 1 UNTIL 3 DO CITY[CID[I],L],       *          *    25     124
              ENTIER(A[CID[I],J]),AA DIV 12,AA MOD 12,A[CID[I],11]);     *          *    25     136
              END;                                                       *          *    25     152
              END;                                                       *          *    25     154
          YR ← YR+1;                                                     *          *    25     156
              END;                                                       *          *    25     158
          WRITE(LINE[PAGE]);                                             *          *    25     160
            WRITE(LINE,<"RUN TIME = ",I5>,TIME(2)/60);                   *          *    25     164
                                                                                       SEG SIZE    6 WDS
     COMMENT PROCEDURE FOR DETERMINING AVERAGE PER CAPITA COSTS;         *          *    25     174
          FOR I←0 STEP 1 UNTIL NOC DO                                    *          *    25     174
              BEGIN                                                      *          *    25     175
          FLAG ← 0;                                                      *          *    25     175
          FOR K←0 STEP 1 UNTIL Y DO                                      *          *    25     175
              BEGIN                                                      *          *    25     177
          READ( DSK[168×K +I],12,A[I,*]);                                *          *    25     177
          FOR J←0 STEP 1 UNTIL 12 DO                                     *          *    25     183
              BEGIN                                                      *          *    25     185
          D[I,J] ← D[I,J] + A[I,J];                                      *          *    25     185
          IF A[I,J] ≠ 0 THEN C[J] ← C[J]+1;                              *          *    25     189
              END;                                                       *          *    25     193
          IF A[I,10]>0.0 AND FLAG=0 THEN                                 *          *    25     196
              BEGIN                                                      *          *    25     198
          STYR ← 57+K;                                                   *          *    25     199
          FLAG ← 1;                                                      *          *    25     200
              END;                                                       *          *    25     201
              END;                                                       *          *    25     201
          FOR J←0 STEP 1 UNTIL 12 DO                                     *          *    25     203
              BEGIN                                                      *          *    25     205
          B[J] ←0;                                                       *          *    25     205
          IF C[J]=0 THEN GO TO L7;                                       *          *    25     206
          D[I,J] ← D[I,J]/C[J];                                          *          *    25     207
          C[J] ← 0;                                                      *          *    25     211
          B[J] ← ENTIER((D[I,J] MOD 1.0) × 240.0 +0.5);                  *          *    25     212
     L7:                                                                 *          *    25     217
              END;                                                       *          *    25     218
          IF(I MOD 48) = 0 THEN                                          *          *    25     220
              BEGIN                                                      *          *    25     221
          WRITE(LINE[PAGE]);                                             *          *    25     222
          WRITE(LINE,FM5);                                               *          *    25     226
```

```
       WRITE(LINE[DBL]);                                                  *              *      25        229
  WRITE(LINE,<"        CITY                    ED.      HEALTH  SEWAGE  REFUSE",   *              *      25        233
         "  PARKS    CHILD.  HIWAY    LIGHT     FIRE    POLICE   TOTAL",           *              *      28        234
         "   PERIOD">);                                                   *              *      28        234
                                                                                              SEG SIZE   24 WDS
       WRITE(LINE);                                                       *              *      25        236
            END;                                                          *              *      25        240
       WRITE(LINE[NO],<4A6>,FOR L←0 STEP 1 UNTIL 3 DO CITY[I,L]);         *              *      25        240
                                                                                              SEG SIZE    4 WDS
       WRITE(LINE,FM6,FOR J←0 STEP 1 UNTIL 10 DO [ENTIER(D[I,J]),B[J]     *              *      25        255
            DIV 12,B[J] MOD 12],STYR);                                    *              *      25        267
            END;                                                          *              *      25        278
       CID[0] ← 0;                                                        *              *      25        280
       FOR I←0 STEP 1 UNTIL NOC-1 DO                                      *              *      25        281
            BEGIN                                                         *              *      25        286
       CID[I+1] ← I+1;                                                    *              *      25        286
       L ← I;                                                             *              *      25        288
L11:                                                                      *              *      25        289
       IF D[CID[L],11] < D[CID[L+1],11] THEN                              *              *      25        290
            BEGIN                                                         *              *      25        293
       TMP ← CID[L];                                                      *              *      25        294
       CID[L] ← CID[L+1];                                                 *              *      25        295
       CID[L+1] ← TMP;                                                    *              *      25        297
       L ← L-1;                                                           *              *      25        299
       IF L≥0 THEN GO TO L11;                                             *              *      25        300
            END;                                                          *              *      25        301
            END;                                                          *              *      25        301
       FOR I←0 STEP 1 UNTIL NOC DO                                        *              *      25        302
            BEGIN                                                         *              *      25        303
       IF(I MOD 49)= 0 THEN                                               *              *      25        303
            BEGIN                                                         *              *      25        304
       WRITE(LINE[PAGE]);                                                 *              *      25        304
       WRITE(LINE,<X35,"AVERAGE POPULATION">);                            *              *      25        308
                                                                                              SEG SIZE    7 WDS
       WRITE(LINE[DBL]);                                                  *              *      25        311
            END;                                                          *              *      25        315
       WRITE(LINE,<4A6,I10>,CITLST[CID[I],L],D[CID[I],11]);               *              *      25        315
                                                                                              SEG SIZE    5 WDS
            END;                                                          *              *      25        331
            END;                                                          *              *      25        333
                                                                                              SEG SIZE  338 WDS
  COMMENT PROCEDURE FOR DETERMINING PERCENTAGE CHANGE OVER GIVEN YEARS;   *              *       2        238
            BEGIN   INTEGER I;                                            *              *       2        238
       FOR I←0 STEP 1 UNTIL NOC DO                                        *              *      32       0STRT
            BEGIN                                                         *              *      32          1
       READ(DSK1[I],18,G[I,*]);                                           *              *      32          1
       READ(DSK1[5×168+I],18,E[I,*]);                                     *              *      32          6
       READ(DSK1[7×168+I],18,F[I,*]);                                     *              *      32         13
       FOR J←0 STEP 1 UNTIL 6 DO                                          *              *      32         19
            BEGIN                                                         *              *      32         21
       A[I,J] ← IF G[I,J]=0 OR F[I,J]=0 THEN 0 ELSE  25.0×(F[I,J]-G[I,J])/*              *      32         21
            (F[I,J]+G[I,J]);                                              *              *      32         30
       H[I,J] ← IF E[I,J]=0 OR F[I,J]=0 THEN 0 ELSE 66.67×(F[I,J]-E[I,J])/*              *      32         34
            (E[I,J]+F[I,J]);                                              *              *      32         43
            END;                                                          *              *      32         47
```

```
      FOR J←7 STEP 1 UNTIL 11 DO                                        *      *   32    49
          BEGIN                                                         *      *   32    52
      A[I,J] ← IF G[I,J+5]=0 OR F[I,J+5]=0 THEN 0 ELSE  25.0×(F[I,J+5]  *      *   32    52
          -G[I,J+5])/(F[I,J+5]+G[I,J+5]);                               *      *   32    61
      H[I,J] ← IF E[I,J+5]=0 OR F[I,J+5]=0 THEN 0 ELSE 66.67×(F[I,J+5]  *      *   32    68
          -E[I,J+5])/(F[I,J+5]+E[I,J+5]);                               *      *   32    77
          END;                                                          *      *   32    84
          END OF I LOOP;                                                *      *   32    86
      FOR J←0 STEP 1 UNTIL 11 DO                                        *      *   32    88
          BEGIN                                                         *      *   32    92
      FOR I←0 STEP 1 UNTIL NOC DO                                       *      *   32    92
          BEGIN                                                         *      *   32    93
      IF J=11 THEN                                                      *      *   32    93
      IF I MOD 46 = 0 THEN                                              *      *   32    93
          BEGIN                                                         *      *   32    95
      WRITE(LINE[PAGE]);                                                *      *   32    96
      WRITE(LINE,<X35,"POPULATION RATE OF CHANGE">);                    *      *   32   100
                                                                                   SEG SIZE   9 WDS
      WRITE(LINE[DBL]);                                                 *      *   32   103
      WRITE(LINE,<X32,"POPULATION",X19,"RATE OF CHANGE">);              *      *   32   107
                                                                                   SEG SIZE  10 WDS
      WRITE(LINE,FM9);                                                  *      *   32   110
      WRITE(LINE);                                                      *      *   32   113
          END;                                                          *      *   32   117
      IF J≠11 AND I MOD 46 = 0 THEN                                     *      *   32   117
          BEGIN                                                         *      *   32   119
      WRITE(LINE[PAGE]);                                                *      *   32   119
      WRITE(LINE[NO],FM7);                                              *      *   32   123
      WRITE(LINE,FT[J]);                                                *      *   32   126
      WRITE(LINE[DBL]);                                                 *      *   32   130
      WRITE(LINE,FM8);                                                  *      *   32   134
      WRITE(LINE,FM9);                                                  *      *   32   137
      WRITE(LINE);                                                      *      *   32   140
          END;                                                          *      *   32   144
      IF J<7 THEN                                                       *      *   32   144
      WRITE(LINE,FM10,FOR L←0 STEP 1 UNTIL 3 DO CITY[I,L],              *      *   32   145
         G[I,J],E[I,J],F[I,J],A[I,J],H[I,J]);                           *      *   32   155
      IF J>6 THEN                                                       *      *   32   169
          BEGIN                                                         *      *   32   170
      K ← J+5;                                                          *      *   32   170
      WRITE(LINE,FM10,FOR L←0 STEP 1 UNTIL 3 DO CITY[I,L],              *      *   32   171
         G[I,K],E[I,K],F[I,K],A[I,J],H[I,J]);                           *      *   32   181
          END;                                                          *      *   32   195
          END                                                           *      *   32   195
          END;                                                          *      *   32   195
          END;                                                          *      *   32   199
                                                                                   SEG SIZE 201 WDS
COMMENT   PROCEDURE FOR DERIVING AVERAGE COST PER CAPITA FOR GIVEN CITY *      *    2   239
          CLASS GROUPS;                                                 *      *    2   239
          BEGIN                                                         *      *    2   239
LABEL L8,L9;                                                            *      *    2   239
      FOR K←0,1 DO                                                      *      *   35     0STRT
          BEGIN                                                         *      *   35     5
      FOR II←0,1 DO                                                     *      *   35     5
          BEGIN                                                         *      *   35    10
```

```
FOR M←0 STEP 1 UNTIL 1700 FOR N←0 STEP 1 UNTIL 10 DO                    *          *     35      10
     BEGIN                                                               *          *     35      12
E[M,N] ←0;                                                               *          *     35      12
F[M,N] ←0;                                                               *          *     35      14
     END OF INITIALIZE LOOP;                                             *          *     35      16
FOR M←0 STEP 1 UNTIL 17 DO CT[M] ← 0;                                    *          *     35      20
IF II=1 THEN                                                             *          *     35      25
     BEGIN                                                               *          *     35      26
FOR I←0 STEP 1 UNTIL 82,111,114,115,119,121,128,130,131,136,137,         *          *     35      26
     141 STEP 1 UNTIL 148,151,154,156,157,161,164 DO                     *          *     35      53
     BEGIN                                                               *          *     35      71
FOR M←1 STEP 1 UNTIL 17 DO                                               *          *     35      71
IF D[I,11] ≤ T[K,M] AND D[I,11] ≥ T[K,M-1] THEN                          *          *     35      72
     BEGIN                                                               *          *     35      78
CT[M] ← CT[M]+1;                                                         *          *     35      78
FOR J←0 STEP 1 UNTIL 10 DO                                               *          *     35      80
     BEGIN                                                               *          *     35      82
E[M,J] ← E[M,J] + D[I,J];                                                *          *     35      82
IF D[I,J] > 0 THEN F[M,J] ← F[M,J]+1;                                    *          *     35      86
G[CT[M],M] ← I;                                                          *          *     35      92
     END;                                                                *          *     35      94
     END;                                                                *          *     35      96
     END OF I LOOP;                                                      *          *     35      99
     END OF II EQUAL1  LOOP;                                             *          *     35      99
IF II=0 THEN                                                             *          *     35      99
     BEGIN                                                               *          *     35     100
FOR I←0 STEP 1 UNTIL NOC-1 DO                                            *          *     35     100
     BEGIN                                                               *          *     35     105
FOR M←1 STEP 1 UNTIL 17 DO                                               *          *     35     105
IF D[I,11] ≤ T[K,M] AND D[I,11] ≥ T[K,M-1] THEN                          *          *     35     106
     BEGIN                                                               *          *     35     112
CT[M] ← CT[M]+1;                                                         *          *     35     112
FOR J←0 STEP 1 UNTIL 10 DO                                               *          *     35     114
     BEGIN                                                               *          *     35     116
E[M,J] ← E[M,J]+ D[I,J];                                                 *          *     35     116
IF D[I,J] > 0 THEN F[M,J] ← F[M,J]+1;                                    *          *     35     120
G[CT[M],M] ← I;                                                          *          *     35     126
     END;                                                                *          *     35     128
     END;                                                                *          *     35     130
     END OF I LOOP;                                                      *          *     35     133
     END OF II EQUAL0  LOOP;                                             *          *     35     133
I←0;                                                                     *          *     35     133
FOR M←1 STEP 1 UNTIL (IF K=0 THEN 9 ELSE 17)DO                           *          *     35     134
     BEGIN                                                               *          *     35     140
IF CT[M] =0 THEN                                                         *          *     35     140
     BEGIN                                                               *          *     35     141
IF I MOD 46 = 0 THEN                                                     *          *     35     141
     BEGIN                                                               *          *     35     143
WRITE(LINE[PAGE]);                                                       *          *     35     143
WRITE(LINE,<X35,"AVERAGE OF AVERAGE PER CAPITA COSTS">);                 *          *     35     147
                                                                                      SEG SIZE   10 WDS
WRITE(LINE);                                                             *          *     35     150
WRITE(LINE,<"  CITY">);                                                  *          *     35     154
                                                                                      SEG SIZE    4 WDS
WRITE(LINE,<" CLASS",X9,"CITY",X14,"ED.   HEALTH  SEWAGE  REFUSE", *     *     35     157
```

```
        "   PARKS  CHILD.   HIWAY   LIGHT   FIRE   POLICE    TOTAL">);*        *     38      159
                                                                                 SEG SIZE  22 WDS
    WRITE(LINE);                                                       *        *     35      160
        END;                                                           *        *     35      164
    WRITE(LINE,<I7,"=">,T[K,M-1]+1);                                   *        *     35      164
                                                                                 SEG SIZE   5 WDS
    WRITE(LINE,<I8,X8,"==",X14,"===",9(X6,"==")),X7,"===">,T[K,M]  ); *        *     35      175
                                                                                 SEG SIZE  14 WDS
    I ← I+2;                                                           *        *     35      184
    GO TO L9;                                                          *        *     35      185
        END;                                                           *        *     35      186
    FOR J←0 STEP 1 UNTIL 10 DO                                         *        *     35      186
        BEGIN                                                          *        *     35      187
    E[M,J] ← IF F[M,J] = 0 THEN 0 ELSE E[M,J]/F[M,J];                  *        *     35      187
    B[J] ← ENTIER((E[M,J] MOD 1.0)×240.0 +0.5);                        *        *     35      194
        END OF J;                                                      *        *     35      199
    FOR N←1 STEP 1 UNTIL CT[M] DO                                      *        *     35      201
        BEGIN                                                          *        *     35      205
    IF I MOD 46 = 0 THEN                                               *        *     35      205
        BEGIN                                                          *        *     35      207
    WRITE(LINE[PAGE]);                                                 *        *     35      207
    WRITE(LINE,<X35,"AVERAGE OF AVERAGE PER CAPITA COSTS">);           *        *     35      211
                                                                                 SEG SIZE  10 WDS
    WRITE(LINE);                                                       *        *     35      214
    WRITE(LINE,<"  CITY">);                                            *        *     35      218
                                                                                 SEG SIZE   4 WDS
    WRITE(LINE,<" CLASS",X9,"CITY",X14,"ED.   HEALTH  SEWAGE  REFUSE", *        *     35      221
        "   PARKS  CHILD.   HIWAY   LIGHT   FIRE   POLICE    TOTAL">);*        *     43      223
                                                                                 SEG SIZE  22 WDS
    WRITE(LINE);                                                       *        *     35      224
        END;                                                           *        *     35      228
    IF N=1 THEN                                                        *        *     35      228
    WRITE(LINE,<I7,"= ",4A6>,T[K,M-1]+1,CITLST[G[N,M],L]);             *        *     35      229
                                                                                 SEG SIZE   6 WDS
    IF CT[M] = 1 THEN                                                  *        *     35      250
        BEGIN                                                          *        *     35      251
    I ← I+1;                                                           *        *     35      251
    WRITE(LINE[NO],<I8>,T[K,M]);                                       *        *     35      253
                                                                                 SEG SIZE   4 WDS
    GO TO L8;                                                          *        *     35      261
        END;                                                           *        *     35      261
    IF N=2 THEN                                                        *        *     35      261
        BEGIN                                                          *        *     35      262
    WRITE(LINE[NO],<I8,X1,4A6>,T[K,M]  ,CITLST[G[N,M],L]);             *        *     35      263
                                                                                 SEG SIZE   6 WDS
    IF CT[M] = 2 THEN                                                  *        *     35      278
    GO TO L8                                                           *        *     35      279
            ELSE WRITE(LINE);                                          *        *     35      279
        END;                                                           *        *     35      283
    IF N>2 THEN                                                        *        *     35      283
        BEGIN                                                          *        *     35      284
    WRITE(LINE[NO],<X9,4A6>,CITLST[G[N,M],L]);                         *        *     35      285
                                                                                 SEG SIZE   5 WDS
    IF CT[M]=N THEN GO TO L8 ELSE WRITE(LINE);                         *        *     35      298
        END;                                                           *        *     35      303
```

```
        GO TO L9;                                                      *         *    35     303
    L8:              WRITE(LINE,<X30,10(I2,".",I2,",",I2),I4,".",I2,    *         *    35     304
              ".",I2>,FOR J←0 STEP 1 UNTIL 10 DO [ENTIER(               *         *    48     306
                                                                                       SEG SIZE  16 WDS
              E[M,J]),B[J] DIV 12,B[J] MOD 12]);                        *         *    35     310
    L9:                                                                 *         *    35     325
        I ← I+1;                                                        *         *    35     326
        END OF N LOOP;                                                  *         *    35     327
            END OF M LOOP;                                              *         *    35     327
            BEGIN                                                       *         *    35     328
    LABEL L12,L13,L14;                                                  *         *    35     328
         WRITE(LINE[PAGE]);                                             *         *    49       OSTRT
         WRITE(LINE,<X25,"DIFFERENCE AND PERCENT DIFFERENCE BETWEEN CITY ", *     *    49       4
              "CLASSES">);                                              *         *    50       5
                                                                                       SEG SIZE  14 WDS
         WRITE(LINE[DBL ]);                                             *         *    49       7
         WRITE(LINE,<"    CITY CLASS",X21,    "ED.   HEALTH  SEWAGE  REFUSE", *   *    49      11
              "   PARKS  CHILD.  HIWAY   LIGHT   FIRE   POLICE    TOTAL">);*    *    51      12
                                                                                       SEG SIZE  22 WDS
         WRITE(LINE);                                                   *         *    49      13
         I←=1;                                                          *         *    49      18
         FOR M←1 STEP 1 UNTIL (IF K=0 THEN 7 ELSE 15) DO                *         *    49      19
            BEGIN                                                       *         *    49      25
         IF CT[M] = 0 THEN GO TO L13;                                   *         *    49      25
    L12: I←I+1;                                                         *         *    49      26
    L14: IF CT[M+1+I] =0 THEN GO TO L12;                                *         *    49      28
         WRITE(LINE,<I7,"-",I7,X15,10F8.2,F10.2>,T[K,M-1]+1,T[K,M],FOR J←0  *     *    49      31
                                                                                       SEG SIZE   9 WDS
              STEP  1 UNTIL 10 DO[E[M,J]-E[M+I+1,J]]);                  *         *    49      41
       WRITE(LINE,<X3,I7,"-",I7,X11,10F8.5,F10.5>,T[K,M+I]+1,T[K,M+I+1],  *       *    49      53
                                                                                       SEG SIZE  10 WDS
              FOR J←0 STEP 1 UNTIL 10 DO[IF E[M,J]>0 THEN (E[M,J]-      *         *    49      64
              E[M+I+1,J])/E[M,J] ELSE E[M+I+1,J]]);                     *         *    49      70
         WRITE(LINE);                                                   *         *    49      83
    L13:                                                                *         *    49      87
         I←-1;                                                          *         *    49      88
              END;                                                      *         *    49      89
              END;                                                      *         *    49      89
                                                                                       SEG SIZE  90 WDS
              END OF II LOOP;                                           *         *    35     329
              END OF K LOOP;                                            *         *    35     329
              END;                                                      *         *    35     330
                                                                                       SEG SIZE 343 WDS
          WRITE(LINE[PAGE]);                                            *         *     2     240
        WRITE(LINE,<"PROCESS AND I/O TIME = ",2I10>,TIME(2)/60,TIME(3)/60);*      *     2     244
                                                                                       SEG SIZE   8 WDS
              END.                                                      *         *     2     256
                                                                                       SEG SIZE 261 WDS
OUTPUT(W) IS SEGMENT NUMBER 0055,PRT ADDRESS IS 0141
BLOCK CONTROL IS SEGMENT NUMBER 0056,PRT ADDRESS IS 0005
INPUT(W) IS SEGMENT NUMBER 0057,PRT ADDRESS IS 0121
GO TO SOLVER  IS SEGMENT NUMBER 0058,PRT ADDRESS IS 0131
ALGOL WRITE   IS SEGMENT NUMBER 0059,PRT ADDRESS IS 0014
ALGOL READ    IS SEGMENT NUMBER 0060,PRT ADDRESS IS 0015
ALGOL SELECT  IS SEGMENT NUMBER 0061,PRT ADDRESS IS 0016
```

APPENDIX D

COMPUTER PROGRAMS

Program for Single Regression and Correlation

```
READY
LISTNH
100 FILES:DT
110 DIM A(166,12), Q$ (12), N(166)
120 FØR I=1 TØ 166
130 FØR J=1 TØ 12
140 READ # 1,A(I,J)
150 NEXT J
160 NEXT I
170 FØR J=1 TØ 12
180 READ Q$(J)
190 NEXT J
200 DATA PØP, EDUC, HEALTH, SEWAGE, REFUSE, PARKS
210 DATA CHILD, HGWYS, LIGHT, FIRE, PØLICE, TØTAL
220 PRINT "CØRRELATIØN CØEFFICIENTS"
230 PRINT "TØTAL PØPULATIØN VS VARIØUS EXPENDITURE CATEGØRIES
240 PRINT
250 PRINT
260 FØR J=2 TØ 12
270 LET X=0
280 LET X1=0
290 LET Y=0
300 LET Y1=0
310 LET Z=0
320 LET N(K)=0
330 FØR I=1 TØ 166
340 IF A(I,J)=0 THEN 410
350 LET Z=Z+(A(I,J)*A(I,1))
360 LET X=X+A(I,J)
370 LET Y=Y+A(I,1)
380 LET X1=X1+(A(I,J)*A(I,J))
390 LET Y1=Y1+(A(I,1)*A(I,1))
400 LET N(K)=N(K)+1
```

APPENDIX D (cont.)

COMPUTER PROGRAMS

Program for Single Regression and Correlation

```
410 NEXT I
420 LET M1=(N(K)*Z)-(X*Y)
430 LET M2=SQR(((N(K)*X1)-(X*X))*((N(K)*Y1)-(Y*Y)))
440 LET R=M1/M2
450 LET R=INT(R*1000+.5)/1000
460 PRINT "FIRST GRØUP", Q$(J),R,R*R*100, N(K)
470 LET X=0
480 LET X1=0
490 LET Y=0
500 LET Y1=0
510 LET Z=0
520 LET N(K)=0
530 FØR I=1 TØ 107
540 IF A(I,J)=0 THEN 610
550 LET Z=Z+(A(I,J)*A(I,1))
560 LET X=X+A(I,J)
570 LET Y=Y+A(I,1)
580 LET X1=X1+(A(I,J)*A(I,J)
590 LET Y1=Y1+(A(I,1)*A(I,1)
600 LET N(K)=N(K)+1
610 NEXT I
620 LET M1=(N(K)*Z)=(X*Y)
630 LET M2=SQR(((N(K)*X1)-(X*X))*((N(K)*Y1)-(Y*Y)))
640 LET R=M1/M2
650 LET R=INT(R*1000+.5)/1000
660 PRINT "SECØND GRØUP", Q$(J),R, R*R100, N(K)
670 PRINT
680 NEXT J
690 END
```

APPENDIX D (cont.)

COMPUTER PROGRAMS

Program for Single Regression and Correlation

CØRRELATIØN CØEFFICIENTS
TØTAL PØPULATIØN VS VARIØUS EXPENDITURE CATEGØRIES

FIRST GRØUP	EDUC	.079	.6241	137
SECØND GRØUP	EDUC	.17	2.89	107
FIRST GRØUP	HEALTH	-.109	1.1881	111
SECØND GRØUP	HEALTH	.061	.3721	83
FIRST GRØUP	SEWAGE	.034	.1156	111
SECØND GRØUP	SEWAGE	-.042	.1764	83
FIRST GRØUP	REFUSE	-.018	.0324	111
SECØND GRØUP	REFUSE	.396	15.6816	83
FIRST GRØUP	PARKS	.025	.0625	111
SECØND GRØUP	PARKS	-01.97	3.08809	83
FIRST GRØUP	CHILD	.31	9.61	106
SECØND GRØUP	CHILD	.31	9.61	106
FIRST GRØUP	HGWYS	-.062	.3844	165
SECØND GRØUP	HGWYS	.16	2.56	107
FIRST GRØUP	LIGHT	-.07	.49	166
SECØND GRØUP	LIGHT	.107	1.1449	107
FIRST GRØUP	FIRE	.058	.3364	127
SECØND GRØUP	FIRE	.047	.2209	106
FIRST GRØUP	PØLICE	.521	27.1441	132
SECØND GRØUP	PØLICE	.447	19.9809	105
FIRST GRØUP	TØTAL	-.014	.0196	166
SECØND GRØUP	TØTAL	.332	11.0224	107

```
BMD02R - STEPWISE REGRESSION - VERSION OF JULY 17,1966 HEALTH SCIENCES COMPUTING FACILITY, UCLA
MODIFIED FOR USE ON THE BURROUGHS B5500 OF THE LOVELACE FOUNDATION BIOMATH DEPT

 PROBLEM
 NUMBER OF CASES                  83
 NUMBER OF ORIGINAL VARIABLES      9
 NUMBER OF VARIABLES ADDED         0
 TOTAL NUMBER OF VARIABLES         9
 NUMBER OF SUB-PROBLEMS            1
LABELS0001POP
LABELS0002POPCHG
LABELS0003AREA
LABELS0004POPDEN
LABELS0005JOB
LABELS0006RETAIL
LABELS0007RATVAL
LABELS0008RATREV
LABELS0009EXPEND
FORMAT (X10,R7.0,X2,R5.1,X2,R5.0,X2,R5.2,X2,R3.0,X2,R4.0,X2,R5.2,X2,R3.0
,X2,R2.0);
      FMT SIZE 021 WDS
```

CORRELATION MATRIX

VARIABLE NUMBER	1	2	3	4	5	6	7	8	9
1	1.000	-0.125	0.881	0.335	0.155	0.584	0.059	-0.198	0.168
2		1.000	-0.030	-0.381	-0.008	0.039	0.200	-0.138	-0.053
3			1.000	-0.036	0.128	0.475	0.023	-0.121	0.205
4				1.000	-0.088	0.044	0.006	-0.142	-0.133
5					1.000	0.185	0.163	-0.217	0.375
6						1.000	0.141	-0.190	0.181
7							1.000	-0.612	0.056
8								1.000	0.132
9									1.000

```
SUB-PROBLM    1
 DEPENDENT VARIABLE              9
 MAXIMUM NUMBER OF STEPS        18
 F-LEVEL FOR INCLUSION     0.010000
 F-LEVEL FOR DELETION      0.005000
 TOLERANCE LEVEL           0.001000


  STEP NUMBER     1
  VARIABLE ENTERED     5

  MULTIPLE R                0.3750
  STD. ERROR OF EST.        3.4365

  ANALYSIS OF VARIANCE
                       DF    SUM OF SQUARES    MEAN SQUARE    F RATIO
        REGRESSION      1        156.495         156.495      13.252
        RESIDUAL       81        956.565          11.809

             VARIABLES IN EQUATION                 .                    VARIABLES NOT IN EQUATION
                                                   .
     VARIABLE      COEFFICIENT  STD. ERROR  F TO REMOVE .     VARIABLE   PARTIAL CORR.     TOLERANCE    F TO ENTER
                                                   .
       (CONSTANT     28.24032 )                    .
        5             0.07430     0.02041    13.2517 .         1          0.12035          0.9760       1.1758
                                                   .           2         -0.05374          0.9999       0.2317
                                                   .           3          0.17063          0.9835       2.3990
                                                   .           4         -0.10779          0.9922       0.9404
                                                   .           6          0.12275          0.9657       1.2238
                                                   .           7         -0.00547          0.9735       0.0024
                                                   .           8          0.23589          0.9528       4.7138


  STEP NUMBER     2
  VARIABLE ENTERED     8

  MULTIPLE R                0.4341
  STD. ERROR OF EST.        3.3603

  ANALYSIS OF VARIANCE
                       DF    SUM OF SQUARES    MEAN SQUARE    F RATIO
        REGRESSION      2        209.723         104.861       9.287
        RESIDUAL       80        903.338          11.292

             VARIABLES IN EQUATION                 .                    VARIABLES NOT IN EQUATION
                                                   .
     VARIABLE      COEFFICIENT  STD. ERROR  F TO REMOVE .     VARIABLE   PARTIAL CORR.     TOLERANCE    F TO ENTER
                                                   .
```

VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE	VARIABLE	PARTIAL CORR.	TOLERANCE	F TO ENTER
(CONSTANT	22.46158)						
5	0.08395	0.02045	16.8566	1	0.16774	0.9475	2.2870
8	0.01881	0.00866	4.7138	2	-0.02086	0.9796	0.0344
				3	0.19986	0.9744	3.2869
				4	-0.07161	0.9649	0.4072
				6	0.16637	0.9420	2.2489
				7	0.17423	0.6250	2.4733

STEP NUMBER 3
VARIABLE ENTERED 3

MULTIPLE R 0.4699
STD. ERROR OF EST. 3.3133

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	3	245.806	81.935	7.464
RESIDUAL	79	867.254	10.978	

VARIABLES IN EQUATION				VARIABLES NOT IN EQUATION			
VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE	VARIABLE	PARTIAL CORR.	TOLERANCE	F TO ENTER
(CONSTANT	21.64914)						
3	0.00008	0.00004	3.2869	1	-0.01729	0.2145	0.0233
5	0.08008	0.02027	15.6024	2	-0.01247	0.9777	0.0121
8	0.02031	0.00858	5.5986	4	-0.06462	0.9632	0.3270
				6	0.08631	0.7463	0.5855
				7	0.19242	0.6220	2.9989

STEP NUMBER 4
VARIABLE ENTERED 7

MULTIPLE R 0.4997
STD. ERROR OF EST. 3.2722

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	4	277.915	69.479	6.489
RESIDUAL	78	835.145	10.707	

VARIABLES IN EQUATION				VARIABLES NOT IN EQUATION			
VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE	VARIABLE	PARTIAL CORR.	TOLERANCE	F TO ENTER

VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE	VARIABLE	PARTIAL CORR.	TOLERANCE	F TO ENTER
(CONSTANT	16.49228)						
3	0.00008	0.00004	3.8078	1	-0.00757	0.2139	0.0044
5	0.07849	0.02004	15.3338	2	-0.04199	0.9566	0.1360
7	0.16363	0.09449	2.9989	4	-0.04593	0.9530	0.1628
8	0.03134	0.01060	8.7361	6	0.07539	0.7432	0.4402

STEP NUMBER 5
VARIABLE ENTERED 6

MULTIPLE R 0.5039
STD. ERROR OF EST. 3.2840

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	5	282.662	56.532	5.242
RESIDUAL	77	830.398	10.784	

VARIABLES IN EQUATION				VARIABLES NOT IN EQUATION			
VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE	VARIABLE	PARTIAL CORR.	TOLERANCE	F TO ENTER
(CONSTANT	16.42282)						
3	0.00007	0.00005	2.0254	1	-0.03930	0.1830	0.1175
5	0.07698	0.02024	14.4606	2	-0.04474	0.9555	0.1524
6	0.00151	0.00227	0.4402	4	-0.05141	0.9484	0.2014
7	0.15953	0.09503	2.8184				
8	0.03179	0.01066	8.8874				

STEP NUMBER 6
VARIABLE ENTERED 4

MULTIPLE R 0.5059
STD. ERROR OF EST. 3.3011

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	6	284.857	47.476	4.357
RESIDUAL	76	828.203	10.897	

VARIABLES IN EQUATION				VARIABLES NOT IN EQUATION			
VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE	VARIABLE	PARTIAL CORR.	TOLERANCE	F TO ENTER
(CONSTANT	17.27641)						

3	0.00007	0.00005	1.8987	1	0.00509	0.0597	0.0019
4	-0.02782	0.06199	0.2014	2	-0.07272	0.7909	0.3987
5	0.07586	0.02050	13.6932				
6	0.00158	0.00229	0.4754				
7	0.15491	0.09608	2.5995				
8	0.03085	0.01092	7.9757				

STEP NUMBER 7
VARIABLE ENTERED 2

MULTIPLE R 0.5098
STD. ERROR OF EST. 3.3143

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	7	289.237	41.320	3.762
RESIDUAL	75	823.824	10.984	

VARIABLES IN EQUATION . VARIABLES NOT IN EQUATION

VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE	VARIABLE	PARTIAL CORR.	TOLERANCE	F TO ENTER
(CONSTANT	17.82056)						
2	-0.04480	0.07095	0.3987	1	0.01491	0.0586	0.0165
3	0.00006	0.00005	1.7283				
4	-0.04575	0.06841	0.4472				
5	0.07451	0.02069	12.9619				
6	0.00168	0.00231	0.5310				
7	0.16166	0.09705	2.7745				
8	0.03003	0.01104	7.3971				

STEP NUMBER 8
VARIABLE ENTERED 1

MULTIPLE R 0.5099
STD. ERROR OF EST. 3.3362

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	8	289.420	36.177	3.250
RESIDUAL	74	823.641	11.130	

VARIABLES IN EQUATION . VARIABLES NOT IN EQUATION

VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE	VARIABLE	PARTIAL CORR.	TOLERANCE	F TO ENTER

(CONSTANT	18,11634)			.
1	0,00000	0,00001	0.0165	.
2	-0,04603	0,07206	0.4080	.
3	0,00005	0,00015	0.0930	.
4	-0,05789	0.11705	0.2446	.
5	0,07394	0,02129	12.0688	.
6	0,00150	0,00272	0.3025	.
7	0.16170	0,09770	2.7396	.
8	0,03002	0,01111	7.2960	.

F-LEVEL INSUFFICIENT FOR FURTHER COMPUTATION

SUMMARY TABLE

STEP NUMBER	VARIABLE ENTERED	VARIABLE REMOVED	MULTIPLE R	MULTIPLE RSQ	INCREASE IN RSQ	F VALUE TO ENTER OR REMOVE	NUMBER OF INDEPENDENT VARIABLES INCLUDED
1	5		0.3750	0.1406	0,1406	13,2517	1
2	8		0.4341	0.1884	0,0478	4.7138	2
3	3		0.4699	0.2208	0,0324	3.2869	3
4	7		0.4997	0.2497	0,0288	2.9989	4
5	6		0.5039	0.2540	0,0043	0.4402	5
6	4		0.5059	0.2559	0,0020	0.2014	6
7	2		0.5098	0.2599	0,0039	0.3987	7
8	1		0.5099	0.2600	0,0002	0.0165	8

LIST OF RESIDUALS

CASE	RESIDUAL	CASE	RESIDUAL	CASE	RESIDUAL	CASE	RESIDUAL	CASE	RESIDUAL
1	3.80831	18	-2.11708	35	1.51217	52	0.56263	69	6.22654
2	-2.73914	19	3.24987	36	-5.01164	53	-3.40423	70	-1.43495
3	-2.05928	20	-3.50785	37	3.09692	54	-0.95710	71	0.51752
4	-4.41364	21	-4.48180	38	-1.27032	55	-3.41622	72	1.93606
5	0.63226	22	1.07753	39	0.35882	56	-0.91923	73	-0.87662
6	-2.04819	23	4.49846	40	3.13944	57	-1.10361	74	2.87838
7	-0.57331	24	7.38976	41	2.45736	58	-3.92731	75	-3.31934
8	2.77145	25	-2.25275	42	-2.16799	59	0.56180	76	2.73588
9	-4.74708	26	-1.20113	43	-4.37874	60	3.26027	77	3.46260
10	-3.48843	27	0.25333	44	7.94014	61	1.61726	78	-3.27480
11	1.37748	28	0.54972	45	-0.74433	62	0.97109	79	-0.98351
12	-2.65992	29	2.76623	46	-5.46969	63	-1.03284	80	0.83625
13	-2.78663	30	-4.61091	47	-2.80123	64	4.97098	81	-1.56780
14	-5.46378	31	1.76145	48	-5.28076	65	-2.02148	82	-1.23374
15	5.48666	32	2.27922	49	-0.32402	66	0.52996	83	1.92628
16	7.02610	33	0.19463	50	1.78796	67	0.06243		
17	3.94960	34	-0.98067	51	4.25536	68	0.37693		

FINISH CARD ENCOUNTERED
PROGRAM TERMINATED
RUN TIME = 17

```
BMD02R - STEPWISE REGRESSION - VERSION OF JULY 17,1966 HEALTH SCIENCES COMPUTING FACILITY, UCLA
MODIFIED FOR USE ON THE BURROUGHS B5500 OF THE LOVELACE FOUNDATION BIOMATH DEPT

  PROBLEM
  NUMBER OF CASES                    83
  NUMBER OF ORIGINAL VARIABLES        9
  NUMBER OF VARIABLES ADDED           7
  TOTAL NUMBER OF VARIABLES          16
  NUMBER OF SUB-PROBLEMS              1
LABELS0002POPCHG
LABELS0003AREA
LABELS0004POPDEN
LABELS0005JOB
LABELS0006RETAIL
LABELS0007RATVAL
LABELS0008RATREV
LABELS0009EXPEND
LABELS0010LOGPOP
LABELS0011LOGARE
LABELS0012LOGPDN
LABELS0013LOGJOB
LABELS0014LOGRTL
LABELS0015LOGRTV
LABELS0016LOGRTN
FORMAT (X10,R7.0,X2,R5.1,X2,R5.0,X2,R5.2,X2,R3.0,X2,R4.0,X2,R5.2,X2,R3.0
,X2,R2.0);
        FMT SIZE 021 WDS
```

CORRELATION MATRIX

VARIABLE NUMBER	1	2	3	4	5	6	7	8	9	10
1	1.000	-0.125	0.881	0.335	0.155	0.584	0.059	-0.198	0.168	0.893
2		1.000	-0.030	-0.381	-0.008	0.039	0.200	-0.138	-0.053	-0.142
3			1.000	-0.036	0.128	0.475	0.023	-0.121	0.205	0.808
4				1.000	-0.088	0.044	0.006	-0.142	-0.133	0.423
5					1.000	0.185	0.163	-0.217	0.375	0.116
6						1.000	0.141	-0.190	0.181	0.306
7							1.000	-0.612	0.056	0.097
8								1.000	0.132	-0.243
9									1.000	0.065
10										1.000

VARIABLE NUMBER	11	12	13	14	15	16	17	18	19	20
1	0.756	0.343	0.158	0.408	0.111	-0.199				
2	0.044	-0.295	0.025	0.121	0.237	-0.125				
3	0.921	-0.035	0.151	0.326	0.058	-0.123				
4	-0.186	0.956	-0.134	-0.112	0.023	-0.139				
5	0.160	-0.045	0.980	0.390	0.228	-0.212				
6	0.297	0.061	0.179	0.873	0.183	-0.198				
7	0.078	0.043	0.151	0.338	0.960	-0.633				
8	-0.139	-0.190	-0.165	-0.346	-0.748	0.995				
9	0.194	-0.178	0.366	0.267	0.099	0.127				
10	0.793	0.461	0.116	0.177	0.149	-0.242				

VARIABLE NUMBER	11	12	13	14	15	16	17	18	19	20
11	1.000	-0.174	0.188	0.231	0.114	-0.146				
12		1.000	-0.087	-0.050	0.075	-0.179				
13			1.000	0.372	0.205	-0.157				
14				1.000	0.413	-0.361				
15					1.000	-0.762				
16						1.000				

SUB-PROBLM 1
DEPENDENT VARIABLE 9
MAXIMUM NUMBER OF STEPS 32
F-LEVEL FOR INCLUSION 0.010000
F-LEVEL FOR DELETION 0.005000
TOLERANCE LEVEL 0.001000

STEP NUMBER 1
VARIABLE ENTERED 5

MULTIPLE R 0.3750
STD. ERROR OF EST. 3.4365

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	1	156.495	156.495	13.252
RESIDUAL	81	956.565	11.809	

VARIABLES IN EQUATION

VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE
(CONSTANT	28.24032)		
5	0.07430	0.02041	13.2517

VARIABLES NOT IN EQUATION

VARIABLE		PARTIAL CORR.	TOLERANCE	F TO ENTER
POP	1	0.12035	0.9760	1.1758
	2	-0.05374	0.9999	0.2317
	3	0.17063	0.9835	2.3990
	4	-0.10779	0.9922	0.9404
	6	0.12275	0.9657	1.2238
	7	-0.00547	0.9735	0.0024
	8	0.23589	0.9528	4.7138
	10	0.02358	0.9865	0.0445
	11	0.14693	0.9745	1.7652
	12	-0.17371	0.9979	2.4892
	13	-0.00696	0.0397	0.0039
	14	0.14159	0.8480	1.6366
	15	0.01526	0.9482	0.0186
	16	0.22811	0.9552	4.3911

STEP NUMBER 2
VARIABLE ENTERED 8

MULTIPLE R 0.4341
STD. ERROR OF EST. 3.3603

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	2	209.723	104.861	9.287

	DF	SUM OF SQUARES	MEAN SQUARE
RESIDUAL	80	903.338	11.292

VARIABLES IN EQUATION

VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE
(CONSTANT	22.46158)		
5	0.08395	0.02045	16.8566
8	0.01881	0.00866	4.7138

VARIABLES NOT IN EQUATION

VARIABLE		PARTIAL CORR.	TOLERANCE	F TO ENTER
POP	1	0.16774	0.9475	2.2870
	2	-0.02086	0.9796	0.0344
	3	0.19986	0.9744	3.2869
	4	-0.07161	0.9649	0.4072
	6	0.16637	0.9420	2.2489
	7	0.17423	0.6250	2.4733
	10	0.08085	0.9368	0.5197
	11	0.17857	0.9630	2.6022
	12	-0.13182	0.9560	1.3969
	13	-0.06948	0.0373	0.3832
	14	0.22609	0.7763	4.2558
	15	0.28602	0.4364	7.0388
	16	-0.06868	0.0094	0.3744

STEP NUMBER 3
VARIABLE ENTERED 15

MULTIPLE R 0.5048
STD. ERROR OF EST. 3.2402

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	3	283.624	94.541	9.005
RESIDUAL	79	829.436	10.499	

VARIABLES IN EQUATION

VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE
(CONSTANT	1.82987)		
5	0.07867	0.01982	15.7611
8	0.04281	0.01231	12.0873
15	12.98289	4.89352	7.0388

VARIABLES NOT IN EQUATION

VARIABLE		PARTIAL CORR.	TOLERANCE	F TO ENTER
POP	1	0.19653	0.9429	3.1337
	2	-0.08623	0.9366	0.5843
	3	0.22711	0.9709	4.2420
	4	-0.04019	0.9517	0.1262
	6	0.15944	0.9398	2.0346
	7	-0.37026	0.0498	12.3924
	10	0.10168	0.9337	0.8148
	11	0.18576	0.9630	2.7876
	12	-0.10969	0.9474	0.9500
	13	-0.11405	0.0366	1.0280
	14	0.17226	0.7357	2.3854

VARIABLE	PARTIAL CORR.	TOLERANCE	F TO ENTER
16	0.01472	0.0086	0.0169

STEP NUMBER 4
VARIABLE ENTERED 7

MULTIPLE R 0.5975
STD. ERROR OF EST. 3.0292

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	4	397.337	99.334	10.825
RESIDUAL	78	715.724	9.176	

VARIABLES IN EQUATION

VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE
(CONSTANT	-51.20004)		
5	0.06535	0.01891	11.9448
7	-1.08815	0.30911	12.3924
8	0.07127	0.01407	25.6695
15	67.71048	16.20547	17.4578

VARIABLES NOT IN EQUATION

VARIABLE		PARTIAL CORR.	TOLERANCE	F TO ENTER
POP	1	0.18674	0.9391	2.7820
	2	-0.17007	0.9040	2.2935
	3	0.22901	0.9694	4.2618
	4	-0.02584	0.9499	0.0514
	6	0.14357	0.9350	1.6205
	10	0.08834	0.9310	0.6056
	11	0.17736	0.9598	2.5007
	12	-0.11850	0.9474	1.0967
	13	-0.11784	0.0366	1.0844
	14	0.11156	0.7090	0.9705
	16	-0.04329	0.0084	0.1446

STEP NUMBER 5
VARIABLE ENTERED 3

MULTIPLE R 0.6251
STD. ERROR OF EST. 2.9678

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	5	434.873	86.975	9.875
RESIDUAL	77	678.187	8.808	

VARIABLES IN EQUATION . VARIABLES NOT IN EQUATION

VARIABLE COEFFICIENT STD. ERROR F TO REMOVE . VARIABLE PARTIAL CORR. TOLERANCE F TO ENTER

VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE	VARIABLE		PARTIAL CORR.	TOLERANCE	F TO ENTER
(CONSTANT	-51.72818)							
3	0.00008	0.00004	4.2618	POP	1	-0.03142	0.2134	0.0751
5	0.06147	0.01862	10.8966		2	-0.16557	0.9026	2.1422
7	-1.06358	0.30307	12.3151		4	-0.01535	0.9478	0.0179
8	0.07320	0.01381	28.0810		6	0.04451	0.7382	0.1509
15	67.03776	15.88024	17.8207		10	-0.16785	0.3246	2.2034
					11	-0.08823	0.1461	0.5962
					12	-0.10856	0.9444	0.9063
					13	-0.16295	0.0356	2.0731
					14	0.04400	0.6412	0.1474
					16	-0.02986	0.0084	0.0678

STEP NUMBER 6
VARIABLE ENTERED 10

MULTIPLE R 0.6386
STD. ERROR OF EST. 2.9448

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	6	453.981	75.664	8.725
RESIDUAL	76	659.079	8.672	

VARIABLES IN EQUATION				VARIABLES NOT IN EQUATION				
VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE	VARIABLE		PARTIAL CORR.	TOLERANCE	F TO ENTER
(CONSTANT	-37.58639)							
3	0.00016	0.00007	5.8878	POP	1	0.09879	0.1273	0.7391
5	0.06047	0.01849	10.6969		2	-0.22023	0.8407	3.8232
7	-1.07995	0.30094	12.8782		4	0.18284	0.3816	2.5941
8	0.07053	0.01382	26.0320		6	0.01177	0.7095	0.0104
10	-2.90690	1.95833	2.2034		11	-0.05501	0.1397	0.2276
15	67.76601	15.76523	18.4767		12	0.05509	0.2967	0.2283
					13	-0.18229	0.0352	2.5779
					14	-0.00326	0.5907	0.0008
					16	-0.02441	0.0084	0.0447

STEP NUMBER 7
VARIABLE ENTERED 2

MULTIPLE R 0.6607
STD. ERROR OF EST. 2.8916

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	7	485.949	69.421	8.302

	DF	SUM OF SQUARES	MEAN SQUARE
RESIDUAL	75	627.112	8.361

VARIABLES IN EQUATION . VARIABLES NOT IN EQUATION

VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE	.	VARIABLE		PARTIAL CORR.	TOLERANCE	F TO ENTER
(CONSTANT	-40.42959)			.					
2	-0.11740	0.06004	3.8232	.	POP	1	0.07438	0.1254	0.4116
3	0.00018	0.00007	7.8372	.		4	0.11901	0.3393	1.0632
5	0.05665	0.01826	9.6248	.		6	0.00343	0.7084	0.0009
7	-1.20008	0.30182	15.8100	.		11	-0.00827	0.1333	0.0051
8	0.07379	0.01368	29.1129	.		12	0.00833	0.2831	0.0051
10	-3.92720	1.99248	3.8849	.		13	-0.14822	0.0341	1.6623
15	75.68474	16.00131	22.3720	.		14	-0.01347	0.5895	0.0134
				.		16	0.01781	0.0081	0.0235

STEP NUMBER 8
VARIABLE ENTERED 13

MULTIPLE R 0.6700
STD. ERROR OF EST. 2.8789

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	8	499.726	62.466	7.537
RESIDUAL	74	613.334	8.288	

VARIABLES IN EQUATION . VARIABLES NOT IN EQUATION

VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE	.	VARIABLE		PARTIAL CORR.	TOLERANCE	F TO ENTER
(CONSTANT	1.80841)			.					
2	-0.10312	0.06080	2.8769	.	POP	1	0.06507	0.1248	0.3104
3	0.00019	0.00007	8.7945	.		4	0.10089	0.3330	0.7507
5	0.17473	0.09337	3.5019	.		6	-0.00841	0.7040	0.0052
7	-1.17935	0.30092	15.3594	.		11	0.00622	0.1320	0.0028
8	0.07728	0.01388	30.9893	.		12	-0.00617	0.2805	0.0028
10	-4.04256	1.98576	4.1444	.		14	-0.02776	0.5844	0.0563
13	-27.26036	21.14347	1.6623	.		16	0.04144	0.0079	0.1256
15	75.26101	15.93451	22.3081	.					

STEP NUMBER 9
VARIABLE ENTERED 4

MULTIPLE R 0.6742

STD. ERROR OF EST. 2.8838

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	9	505.969	56.219	6.760
RESIDUAL	73	607.091	8.316	

VARIABLES IN EQUATION

VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE
(CONSTANT	4.74689)		
2	-0.08593	0.06405	1.8001
3	0.00025	0.00009	7.3959
4	0.07919	0.09140	0.7507
5	0.16622	0.09404	3.1242
7	-1.19260	0.30182	15.6133
8	0.07825	0.01395	31.4588
10	-6.03760	3.04282	3.9371
13	-24.74012	21.37800	1.3393
15	76.27105	16.00394	22.7125

VARIABLES NOT IN EQUATION

VARIABLE	PARTIAL CORR.	TOLERANCE	F TO ENTER
POP 1	0.00485	0.0788	0.0017
6	-0.04945	0.6077	0.1765
11	0.20963	0.0279	3.3093
12	-0.20976	0.0591	3.3138
14	-0.04621	0.5667	0.1541
16	0.03706	0.0079	0.0990

STEP NUMBER 10
VARIABLE ENTERED 12

MULTIPLE R 0.6918
STD. ERROR OF EST. 2.8392

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	10	532.681	53.268	6.608
RESIDUAL	72	580.379	8.061	

VARIABLES IN EQUATION

VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE
(CONSTANT	-3.82354)		
2	-0.06438	0.06416	1.0070
3	0.00017	0.00010	2.7192
4	0.39622	0.19603	4.0854
5	0.15980	0.09265	2.9747
7	-1.23503	0.29806	17.1692
8	0.07796	0.01374	32.2139
10	-3.12881	3.39522	0.8492
12	-13.03447	7.16026	3.3138
13	-22.72117	21.07625	1.1622
15	78.06788	15.78707	24.4535

VARIABLES NOT IN EQUATION

VARIABLE	PARTIAL CORR.	TOLERANCE	F TO ENTER
POP 1	0.04573	0.0761	0.1488
6	0.00587	0.5660	0.0024
11	-0.04874	0.0000	0.1690
14	0.01928	0.5137	0.0264
16	0.10038	0.0073	0.7227

STEP NUMBER 11
VARIABLE ENTERED 16

MULTIPLE R 0.6956
STD. ERROR OF EST. 2.8446

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	11	538.529	48.957	6.050
RESIDUAL	71	574.531	8.092	

VARIABLES IN EQUATION

VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE
(CONSTANT	-86.17367)		
2	-0.07095	0.06474	1.2008
3	0.00016	0.00010	2.4872
4	0.43474	0.20157	4.6518
5	0.17046	0.09367	3.3113
7	-1.20847	0.30027	16.1981
8	0.00870	0.08262	0.0111
10	-2.81011	3.42238	0.6742
12	-14.76798	7.45825	3.9207
13	-25.43261	21.35644	1.4182
15	78.10230	15.81761	24.3807
16	43.23291	50.85412	0.7227

VARIABLES NOT IN EQUATION

VARIABLE	PARTIAL CORR.	TOLERANCE	F TO ENTER
POP 1	0.05351	0.0757	0.2010
6	0.02269	0.5509	0.0361
11	-0.02193	0.0000	0.0337
14	0.04874	0.4755	0.1667

STEP NUMBER 12
VARIABLE ENTERED 1

MULTIPLE R 0.6966
STD. ERROR OF EST. 2.8608

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	12	540.174	45.015	5.500
RESIDUAL	70	572.886	8.184	

VARIABLES IN EQUATION

VARIABLE	COEFFICIENT	STD. ERROR	F TO REMOVE
(CONSTANT	-87.39638)		

VARIABLES NOT IN EQUATION

VARIABLE	PARTIAL CORR.	TOLERANCE	F TO ENTER

VARIABLE		COEFFICIENT	STD. ERROR	F TO REMOVE	VARIABLE	PARTIAL CORR.	TOLERANCE	F TO ENTER
POP	1	0.00000	0.00001	0.2010	6	-0.00977	0.3697	0.0066
	2	-0.07330	0.06532	1.2592	11	-0.01719	0.0000	0.0204
	3	0.00011	0.00016	0.4336	14	0.02366	0.3375	0.0387
	4	0.41952	0.20554	4.1661				
	5	0.16962	0.09423	3.2407				
	7	-1.19231	0.30411	15.3713				
	8	0.00545	0.08340	0.0043				
	10	-2.73199	3.44620	0.6285				
	12	-15.45057	7.65354	4.0753				
	13	-25.61935	21.48167	1.4223				
	15	77.19092	16.03674	23.1686				
	16	44.91992	51.28095	0.7673				

STEP NUMBER 13
VARIABLE REMOVED 8

MULTIPLE R 0.6966
STD. ERROR OF EST. 2.8407

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	11	540.140	49.104	6.085
RESIDUAL	71	572.921	8.069	

VARIABLES IN EQUATION					VARIABLES NOT IN EQUATION			
VARIABLE		COEFFICIENT	STD. ERROR	F TO REMOVE	VARIABLE	PARTIAL CORR.	TOLERANCE	F TO ENTER
(CONSTANT		-93.57807)						
POP	1	0.00000	0.00001	0.2107	6	-0.00853	0.3777	0.0051
	2	-0.07379	0.06443	1.3115	8	0.00781	0.0075	0.0043
	3	0.00010	0.00016	0.4357	11	-0.01455	0.0000	0.0148
	4	0.42219	0.20000	4.4561	14	0.02491	0.3675	0.0435
	5	0.17025	0.09307	3.3459				
	7	-1.18831	0.29579	16.1395				
	10	-2.70639	3.39974	0.6337				
	12	-15.59169	7.29055	4.5737				
	13	-25.78558	21.18027	1.4821				
	15	77.06268	15.80409	23.7766				
	16	48.22243	8.48309	32.3139				

STEP NUMBER 14
VARIABLE ENTERED 14

MULTIPLE R 0.6968
STD. ERROR OF EST. 2.8600

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	12	540.495	45.041	5.507
RESIDUAL	70	572.565	8.180	

VARIABLES IN EQUATION

VARIABLE		COEFFICIENT	STD. ERROR	F TO REMOVE
(CONSTANT		-96.55072)		
POP	1	0.00000	0.00001	0.0737
	2	-0.07272	0.06508	1.2486
	3	0.00011	0.00016	0.4457
	4	0.43690	0.21337	4.1928
	5	0.16731	0.09476	3.1171
	7	-1.17911	0.30106	15.3388
	10	-2.33981	3.84818	0.3697
	12	-15.97724	7.56960	4.4551
	13	-25.32073	21.44069	1.3947
	14	0.74430	3.57056	0.0435
	15	76.29638	16.33076	21.8271
	16	48.16232	8.54568	31.7630

VARIABLES NOT IN EQUATION

VARIABLE	PARTIAL CORR.	TOLERANCE	F TO ENTER
6	-0.06157	0.0911	0.2626
8	0.00071	0.0068	0.0000
11	-0.01513	0.0000	0.0158

STEP NUMBER 15
VARIABLE ENTERED 6

MULTIPLE R 0.6982
STD. ERROR OF EST. 2.8752

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	13	542.665	41.743	5.050
RESIDUAL	69	570.395	8.267	

VARIABLES IN EQUATION

VARIABLE		COEFFICIENT	STD. ERROR	F TO REMOVE
(CONSTANT		-97.57300)		
POP	1	0.00000	0.00001	0.1516
	2	-0.06710	0.06633	1.0233
	3	0.00012	0.00016	0.5438
	4	0.46021	0.21927	4.4050
	5	0.16045	0.09620	2.7816
	6	-0.00291	0.00568	0.2626
	7	-1.14006	0.31211	13.3429
	10	-2.98532	4.06855	0.5384
	12	-16.15653	7.61783	4.4981

VARIABLES NOT IN EQUATION

VARIABLE	PARTIAL CORR.	TOLERANCE	F TO ENTER
8	-0.01321	0.0065	0.0119
11	-0.01655	0.0000	0.0186

13	-24.54934	21.60703	1.2909	.
14	4.00647	7.30854	0.3005	.
15	73.57936	17.25251	18.1889	.
16	47.61814	8.65645	30.2598	.

STEP NUMBER 16
VARIABLE ENTERED 8

MULTIPLE R 0.6983
STD. ERROR OF EST. 2.8960

ANALYSIS OF VARIANCE

	DF	SUM OF SQUARES	MEAN SQUARE	F RATIO
REGRESSION	14	542.765	38.769	4.623
RESIDUAL	68	570.295	8.387	

VARIABLES IN EQUATION

VARIABLE		COEFFICIENT	STD. ERROR	F TO REMOVE
(CONSTANT		-109.27389)		
POP	1	0.00000	0.00001	0.1470
	2	-0.06754	0.06694	1.0182
	3	0.00012	0.00016	0.5220
	4	0.46855	0.23375	4.0178
	5	0.16077	0.09695	2.7503
	6	-0.00305	0.00587	0.2706
	7	-1.12945	0.32909	11.7788
	8	-0.00984	0.09034	0.0119
	10	-2.91089	4.15454	0.4909
	12	-16.48268	8.23616	4.0050
	13	-24.73704	21.83150	1.2839
	14	4.28497	7.79256	0.3024
	15	73.09197	17.94389	16.5923
	16	53.54936	55.12990	0.9435

VARIABLES NOT IN EQUATION

VARIABLE	PARTIAL CORR.	TOLERANCE	F TO ENTER
11	-0.01351	0.0000	0.0122

F-LEVEL INSUFFICIENT FOR FURTHER COMPUTATION

SUMMARY TABLE

STEP NUMBER	VARIABLE ENTERED	VARIABLE REMOVED	MULTIPLE R	RSQ	INCREASE IN RSQ	F VALUE TO ENTER OR REMOVE	NUMBER OF INDEPENDENT VARIABLES INCLUDED
1	5		0.3750	0.1406	0.1406	13.2517	1
2	8		0.4341	0.1884	0.0478	4.7138	2
3	15		0.5048	0.2548	0.0664	7.0388	3

4		7		0.5975	0.3570	0.1022	12.3924	4
5		3		0.6251	0.3907	0.0337	4.2618	5
6		10		0.6386	0.4079	0.0172	2.2034	6
7		2		0.6607	0.4366	0.0287	3.8232	7
8		13		0.6700	0.4490	0.0124	1.6623	8
9		4		0.6742	0.4546	0.0056	0.7507	9
10		12		0.6918	0.4786	0.0240	3.3138	10
11		16		0.6956	0.4838	0.0053	0.7227	11
12	PØP	1		0.6966	0.4853	0.0015	0.2010	12
13			8	0.6966	0.4853	0.0000	0.0043	11
14		14		0.6968	0.4856	0.0003	0.0435	12
15		6		0.6982	0.4875	0.0020	0.2626	13
16		8		0.6983	0.4876	0.0001	0.0119	14

LIST OF RESIDUALS

CASE	RESIDUAL	CASE	RESIDUAL	CASE	RESIDUAL	CASE	RESIDUAL	CASE	RESIDUAL
1	3.63789	18	-1.78113	35	1.79703	52	2.01092	69	5.98856
2	-2.39812	19	4.07221	36	-2.53179	53	-2.67015	70	-0.58665
3	-1.78756	20	-3.06002	37	2.78955	54	1.51292	71	-0.00823
4	-2.61426	21	-6.02519	38	-3.03141	55	-1.54034	72	1.43315
5	-0.26413	22	0.12285	39	-0.79956	56	1.74563	73	-0.92139
6	-0.34805	23	-2.56242	40	1.89666	57	-0.18772	74	4.07914
7	-0.12131	24	4.58286	41	2.10291	58	-2.57250	75	-2.92166
8	0.17236	25	-1.48692	42	-1.62060	59	0.30164	76	3.31671
9	-3.65870	26	-1.92654	43	-3.12797	60	0.38543	77	1.22253
10	-3.15546	27	0.70005	44	5.96263	61	-1.71911	78	-3.72228
11	2.33204	28	1.22688	45	2.20512	62	0.44565	79	-0.24852
12	-2.27892	29	2.97790	46	1.28998	63	0.05441	80	-0.27332
13	-2.74690	30	-3.48312	47	-4.75042	64	4.72102	81	-1.06693
14	-5.86918	31	-0.51791	48	-4.59752	65	-0.53403	82	-1.16206
15	2.36375	32	2.26351	49	1.16691	66	-0.25704	83	3.82924
16	4.60077	33	0.99412	50	0.83789	67	1.71661		
17	1.53918	34	-0.79131	51	2.99006	68	0.33970		

FINISH CARD ENCOUNTERED
PROGRAM TERMINATED
RUN TIME = 31

ADDENDUM TO THESIS

"Any exercise which attempts to relate size to performance in local government faces formidable problems."[116]

ADDENDUM

During the formative period of this study the research undertakings which the Royal Commissions on Local Government were ultimately to assume were unclear. As a consequence, the author, wishing to avoid the pitfalls of an open-ended study, made the decision that only those events pertaining to local government in Britain occurring during and prior to 1964 would be included in the thesis. This closure year was selected due to the author's desire to keep events and the overall data set compatible. Nineteen sixty-four was the most current year for which a complete data set on revenues and expenditures for each of the local authorities included in the study could be acquired. Subsequent years were incomplete due to late filings of Epitomes of Accounts or Abstracts of Accounts by various local authorities. While the substantive part of this study is based on data pre-dating 1965, it is clearly in the best interests of the thesis to acknowledge the findings of the Royal Commissions on Local Government, as the general conclusions of the Commissions are very much similar to those of this study.

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[116] Royal Commission on Local Government in England, 1966-1969, Report, Vol. I. London: H. M. S. O., June 1969, p. 58.

The question of a single best size for local governments was never really addressed within the context of the Royal Commissions' reports. Rather, the concern was on finding suitable sizes for functional services offered by the various authorities. As in the language of the Scottish report,

> "Our object...was...one of trying to find what scale or scales of Administration are indicated by the various functions considered on their own and in combination with one another."[117]

In arriving at conclusions as to the most appropriate scale or scales for functional activities, the Commissions based their deliberations as much on the opinions of witnesses as on objective measurement. In fact, objective measurement proved to be very elusive, and only in terms of the English Commission were attempts made at statistically validating a relationship between size of services areas and performance by service.

Three studies were undertaken by outside research bodies, and two by government departments to attempt to examine the relationship between the size of local authorities (mainly their population but in some cases other environmental characteristics) and their performance of a number of major functions. A sixth study, examining the relation between the size of local authorities and certain

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[117]Royal Commission on Local Government in Scotland, 1966-1969, Report. Edinburgh: H. M. S. O., September 1969, p. 135.

aspects of staffing, was undertaken by the research staff of the English Commission.[118]

The analytical procedures used by the outside research bodies and by the staff of the English Commission require special note in this addendum, as they are essentially the same as in this study. Data were compiled which described local authorities either in terms of size, such as total population and 1d. rate product, or in terms of environmental characteristics, such as population density and social class composition. These data were then related to others--some purely numerical, some financial--which described the "output" or performance of particular services by local authorities.

The results of the statistical attempts to relate size of authority to performance by service are indeed interesting in terms of the findings of the present study. The overriding conclusion which emerged was that size cannot statistically be proved to have a very important effect on performance. Some instances were found where economies of scale were apparently operating, notably in the larger counties and county boroughs in relation to highways, some management areas, some aspects of education, and in the children's and the mental health services.[119]

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[118]Royal Commission on Local Government in England, Report, Vol. I, op. cit., p. 57.

[119]Royal Commission on Local Government in England, Report, Vol. I., op. cit., p. 58.

The ultimate recommendations which emerged from the Royal Commissions on Local Government in terms of appropriate scales for local authorities to optimally provide services were based in no small measure upon the subjective impressions of those who by their positions possessed direct disinterested knowledge of the quality of local authority performance. The English Commission established a minimum population size for all the main services of 250,000. While the maximum was not as clearly defined as the minimum, a general impression which emerged was a scale of around 1,000,000. In general, the Scottish Commission arrived at essentially the same conclusions, although the pattern of population in the country in a few instances required a smaller minimum, notably with regard to the environmental services where a minimum of 50,000 was deemed best.[120]

The terms "efficiency," "economy," "performance," and "quality" recur throughout the evidence given before the Royal Commissions on Local Government. It was the overriding conclusion which emerged from the Commissions' efforts that each of these terms are multi-faceted in character and that they defy rigorous measurement. Just arriving at a satisfactory definition of meaning for each proved formidable in the extreme. As a result, the important point that emerges

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[120]Royal Commission on Local Government in England, Report, Vol. I., op. cit., p. 4; and Royal Commission on Local Government in Scotland, 1966-1969, Report. Edinburgh: H. M. S. O., September 1969, p. 121.

from the Royal Commissions reports in terms of this thesis is that it is very difficult indeed to quantify the various facets of local government services and to distinguish "good" from "barely adequate" or "bad."

There are two additional studies on the subject of city-size and municipal or economic efficiency, not cited in either Chapter II or III of the thesis, nor related to the Royal Commissions on Local Government, which the author would like to draw attention to in this addendum. These are the works of Neutze[121] and Alonzo.[122]

Neutze has analyzed data on the size of cities in Australia and found very little evidence of any meaningful trends. Rather than a point of diminishing returns in terms of size, he detected instead economies of growth. However, he points out that any meaning that one might attach to his analysis could be spurious as there is the difficulty of acquiring suitable data as well as the inability to measure quality of services. On a deductive basis Neutze contends that it is meaningless to seek for an optimum size for a city; rather, it is much better to think of an optimum size distribution.

Alonzo offers an entirely different variation on the

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[121]G. M. Neutze, Economic Policy and the Size of Cities (Canberra: The Australian National University, 1965), 136 pp.

[122]William Alonzo, The Economics of Urban Size, Working Paper 138. Institute of Urban and Regional Development. University of California, Berkeley, November 1970, 31 pp.

city-size to performance relationship. His analysis largely concerns economic productivity in cities. He argues that the minimum costs approach to city size is insufficient. Such an approach makes sense only if output per capita is constant. In fact, based upon his data, output per capita is an increasing function of urban size. Therefore, a more sensible objective would be to deal with the relationship of outputs and inputs, rather than only with inputs.

In every country for which Alonzo could get relatively meaningful data, local product per capita (or some index for it, such as income or wages) rises with urban size, and where comparable figures on cost are available, these rise far more slowly if at all. The most important conclusion which emerges from Alonzo's study is the suggestion that even the largest cities have not yet reached excessive sizes from the point of view of growth and productivity.

The implication which these foregoing studies have in terms of the present study is simply one of supporting very strongly the conclusions offered in the thesis. Essentially the same statistical procedures were used in the present study as in certain of the research reports commissioned by the Royal Commission on Local Government in England, with the same results. In the opinion of the author of this study, the most penetrating conclusion which can be offered in terms of the Royal Commissions on Local Government, the analyses of Neutze and Alonzo, and this thesis is a simple paraphrasing of the quote at the beginning of this addendum which literally sums up the problem very succinctly. Any attempt to relate city-size to municipal efficiency faces formidable problems, some of a conceptual nature, some of a methodological nature, and some totally unforeseen as insufficient research has been accomplished to date to understand the multi-faceted nature of many of the service and operational characteristics of cities.

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FIGURE 2

LOCAL AUTHORITIES INCLUDED IN STUDY